

MAINE STATE LEGISLATURE

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Report to Maine Legislature

Lyme and other Tickborne Illnesses

January, 2018

Submitted by
Maine Department of Health and Human Services, Maine Center for
Disease Control and Prevention (Maine CDC), Division of Disease Control,
Infectious Disease Program



Paul R. LePage, Governor

Ricker Hamilton, Commissioner

Department of Health and Human Services
Commissioner's Office
221 State Street
11 State House Station
Augusta, Maine 04333-0011
Tel.: (207) 287-3707; Fax (207) 287-3005
TTY Users: Dial 711 (Maine Relay)

February 6, 2018

Senator Eric Brakey, Chair
Representative Patricia Hymanson, Chair
Joint Standing Committee on Health and Human Services
#100 State House Station
Augusta, Maine 04333-0100

Dear Senator Brakey, Representative Hymanson and Members of the Joint Standing Committee on Health and Human Services:

Enclosed please find the 2018 Report to Maine Legislature: Lyme and other Tickborne Illnesses submitted by the Department of Health and Human Services. This report is required under Title 22 of the M.R.S.A., Chapter 266-B. The report provides information on Maine CDC's Lyme disease and other Tick-borne Illnesses surveillance information, activities, and accomplishments in 2017.

Please feel free to contact Dr. Bruce Bates at 287-3270 if you have any questions or concerns.

Sincerely,

Ricker Hamilton
Commissioner

RH/klv

Enclosure

Report to Maine Legislature – Lyme Disease

During the first special session of the 123rd Legislature in 2008, hearings and discussion over proposed legislation regarding the reporting of Lyme disease led to Chapter 561 of the Session Laws. This law, 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, directed Maine Center for Disease Control and Prevention to submit an annual 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. This report was to include recommendations for legislation to address public health programs for the prevention and treatment of Lyme disease and other tickborne illnesses in the state, as well as to address a review and evaluation of Lyme disease and other tickborne illnesses in Maine.

A bill in the second session of the 124th Legislature in 2010 amended these laws to include information on diagnosis of Lyme disease.

Title 22, Chapter 266-B, Subsection 1645 in Maine statutes, directs 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 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 Center for Disease Control and Prevention to health care 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 Center for Disease Control and Prevention 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 or other organizations.](#)

This is the tenth annual report to the Legislature and includes an update on activities conducted during 2017.

Executive Summary

Lyme disease is a notifiable condition in the State of Maine. The goal of Lyme 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. Reported cases are classified as confirmed, probable, and suspect based on clinical symptoms and laboratory testing interpreted using criteria established by the Council of State and Territorial Epidemiologists. The surveillance case definition is not intended to be used in clinical diagnosis. Lyme disease surveillance is passive, dependent upon reporting, and therefore likely to be an under-representation of the true burden of Lyme disease in Maine. Federal CDC released a statement in 2013 that the true burden of Lyme disease may be up to ten times the number of reported cases.

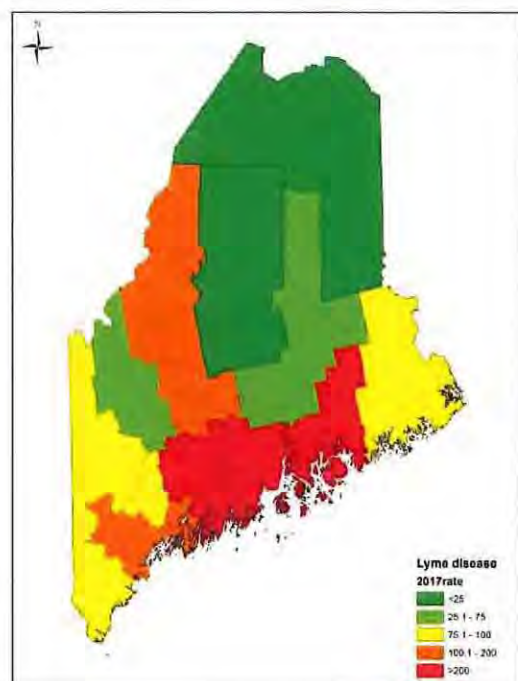
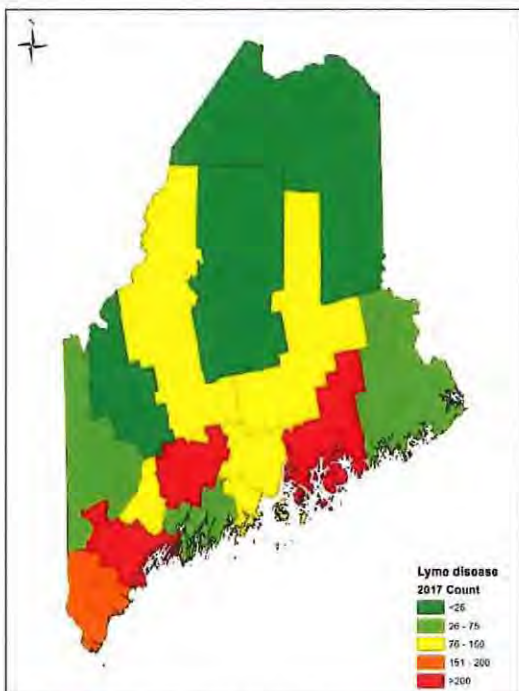
Maine Lyme Disease Summary, 2017 (Preliminary data as of January 16, 2018)

- 1,769 confirmed and probable cases
- Most common symptoms of reported cases* of Lyme disease in Maine included:
 - Erythema Migrans (characteristic expanding rash): 872 cases (49%)
 - Arthritis (joint swelling): 513 cases (29%)
 - Neurological (Bells Palsy or other cranial neuritis): 202 cases (11%)

* Cases could report more than one symptom
- Hospitalization occurred in 58 cases (3%).
- Among case patients with a reported date of symptom onset, 68% began experiencing symptoms during June, July, or August. Date of symptom onset is missing for 17% of cases.

Confirmed and Probable Cases of Lyme Disease – Maine 2017*

Lyme Disease Cases per 100,000 persons (Rate) – Maine 2017*



* 2017 data are preliminary as of 01/18/2018

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

A. Lyme disease

Lyme disease is caused by the bacteria *Borrelia burgdorferi* which is transmitted to a person through the bite of an infected deer tick (*Ixodes scapularis*). Symptoms of Lyme disease include the formation of a characteristic expanding rash (erythema migrans) at the site of a tick bite 3-30 days after exposure. 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), Bell's palsy and other cranial nerve palsies, 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. IV antibiotics for up to 28 days may be needed for some cases of Lyme disease which affect the nervous system, joints, or heart.

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

Many endemic states are no longer counting cases of Lyme disease as the burden is too high on the health department. This affects the national and regional rates as the number of cases appears to drop, but in reality, it is because these health departments are using a system to estimate the number of cases, rather than trying to count each individual case. As of 2017, Maine is still counting individual cases but as the burden continues to increase, and funding is limited, Maine will likely transition to an estimation system in the future.

Reported Cases of Lyme Disease -- United States, 2016



Source: federal CDC (https://www.cdc.gov/lyme/resources/reportedcasesoflymedisease_2016.pdf)

The first documented case of Maine-acquired Lyme disease was diagnosed in 1986. The current 2017 numbers are an increase from previous years and will continue to rise as more reports are returned to Maine CDC. In the 1990's the great majority of Lyme disease cases occurred among residents of south coastal Maine, principally in York County. Disease incidence remains high in the southern and the Mid-Coast areas but is starting to increase in the northern and western counties as well, making the problem statewide. Androscoggin, Aroostook, Franklin, Hancock, Kennebec, Knox, Oxford, Penobscot, Piscataquis, Somerset, Waldo, and Washington counties rates increased from 2016 to 2017. Seven counties have rates of Lyme disease higher than the State rate (Hancock, Kennebec, Knox, Lincoln, Sagadahoc, Somerset, and Waldo).

In 2017 (preliminary data as of January 16, 2017) providers reported 1,769 confirmed and probable cases of Lyme disease among Maine residents, which is a rate of 132.4 cases of Lyme disease per 100,000 persons in Maine. Twenty-eight percent (28%) of reported cases were from the southern counties (Cumberland and York), and 23% of reported cases were from the Midcoast counties (Knox, Lincoln, Sagadahoc, and Waldo).

Forty-one percent (41%) of cases were female and fifty-nine percent (59%) of cases were male. The median age of cases in 2017 was 53 years of age (average age of 46 years). The age at diagnosis ranged from 1-99 years. Sixty-eight percent (68%) of the cases with a known onset date had onset during June, July, or August (date of onset is missing for 17% of cases). Providers reported 58 persons (3% of all cases) were hospitalized with Lyme disease. For further Lyme disease statistics in Maine please see [Appendix 1](#).

B. Other Tickborne Diseases in Maine

Anaplasmosis:

Anaplasmosis is a disease caused by the bacteria *Anaplasma phagocytophilum* which infects white blood cells (neutrophils). Anaplasma was previously known as human granulocytic ehrlichiosis (HGE) or human granulocytic anaplasmosis (HGA) but was renamed in 2003 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. Encephalitis/ meningitis may occur but is rare. Anaplasmosis is transmitted to a person through the bite of an infected deer tick (*Ixodes scapularis*). Preliminary data as of January 16, 2017 showed 662 cases of anaplasmosis reported in 2017, a 78% increase from the 372 cases in 2016. Cases occurred in Androscoggin, Cumberland, Franklin, Hancock, Kennebec, Knox, Lincoln, Oxford, Penobscot, Sagadahoc, Somerset, Waldo, Washington, and York counties. 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 (*Ixodes scapularis*). Signs of babesiosis usually range from no symptoms (asymptomatic) to serious disease. Common symptoms include extreme fatigue, aches, fever, chills, sweating, dark urine, and possibly anemia. People who are infected generally make a full recovery as long as they have a healthy spleen and do not have other diseases that prevent them from fighting off infections. Preliminary data as of January 16, 2017 showed 117 cases of babesiosis reported in 2017, which is an increase from the 82 cases in 2016. Cases occurred in Androscoggin, Cumberland, Hancock, Kennebec, Knox, Lincoln, Oxford, Penobscot, Piscataquis, Sagadahoc, Somerset, Waldo, and York counties. For further babesiosis disease statistics in Maine please see [Appendix 2](#).

Borrelia miyamotoi:

Borrelia miyamotoi is a species of spiral-shaped bacteria 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, *B. miyamotoi* has now been detected in two species of North American ticks, the black-legged or “deer” tick (*Ixodes scapularis*) and the western black-legged tick (*Ixodes pacificus*). Individuals with this infection are likely to have fever, chills, and headache. Other common symptoms include joint pain and fatigue. Unlike Lyme disease, rash is uncommon. Although *Borrelia miyamotoi* is not nationally notifiable, federal CDC in association with endemic states developed a standardized case classification to help standardize reporting and understand the prevalence in the United States. Preliminary data as of January 16, 2017 showed six cases with *Borrelia miyamotoi* infections in Maine. Cases occurred in Androscoggin, Cumberland, Knox, Lincoln, and Sagadahoc counties.

Ehrlichiosis:

Ehrlichiosis is a disease caused by the bacteria *Ehrlichia chaffeensis* which infects white blood cells (monocytes). Ehrlichia was previously known as human monocytic ehrlichiosis (HME). Signs and symptoms of ehrlichiosis include: fever, headache, nausea, and body aches. Encephalitis/ meningitis may occur. Ehrlichiosis is transmitted to a person through the bite of an infected lone star tick (*Amblyomma americanum*). Ehrlichiosis is uncommon in Maine as the tick is not commonly found here. However, this may be a disease to watch for as the tick appears to be moving north. Preliminary data as of January 16, 2017 showed ten probable cases of *Ehrlichia chaffeensis* reported in 2017 from Androscoggin, Cumberland, Kennebec, Somerset, and York counties. Maine had ten probable cases of Ehrlichia/Anaplasma Undetermined in 2017, which occurs when serologies are done, but titers are the same for both Ehrlichia and Anaplasma so we cannot tell which organism was present. For further ehrlichiosis disease statistics in Maine please see [Appendix 2](#).

Powassan:

Powassan is a virus transmitted to humans through the bite of an infected woodchuck tick (*Ixodes cookei*) or deer tick (*Ixodes scapularis*). It is the only tickborne arbovirus occurring in the United States and Canada. Approximately 100 cases of Powassan were reported in the United States in the last decade, and cases appear to be increasing. Signs and symptoms of Powassan include fever, headache, vomiting, weakness, confusion, seizures, and memory loss. Long-term neurologic problems may occur. There were three reported cases of Powassan in Maine in 2017. One case was reported in Cumberland county and two cases were reported in Knox county. With the two cases reported in late spring, Maine CDC put together a Powassan fact sheet to inform the public about their risk. This is included as [Appendix 3](#).

Spotted Fever Rickettsiosis:

Spotted Fever Rickettsioses (SFR) are a group of bacterial illnesses, the most common of which is Rocky Mountain Spotted Fever (RMSF). Signs and symptoms of RMSF include fever, chills, headache, gastrointestinal symptoms, and a maculopapular rash often on the palms and the soles. RMSF is transmitted to a person through the bite of an infected dog tick (*Dermacentor variabilis*). RMSF is not known to be endemic in Maine, but could become an emerging disease. Preliminary data as of January 16, 2017 showed three probable cases of SFR reported in 2017. These cases were reported in Androscoggin and York counties. For further SFR disease statistics in Maine please see [Appendix 2](#).

Other Emerging Tickborne Diseases:

Federal CDC and other researchers are continually on the watch for new or emerging tickborne disease. Pathogens identified in the last few years include Heartland virus, and Bourbon virus. Maine has no documented cases of any of these diseases, but there is serological evidence (from either humans or wild animals) of Heartland virus in Maine, so these are diseases to watch.

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 Center for Disease Control and Prevention 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:

https://www.idsociety.org/uploadedfiles/idsa/guidelines-patient_care/pdf_library/lyme%20disease.pdf

Lyme disease is diagnosed clinically with the aid of laboratory testing. An erythema migrans in an endemic area is sufficiently distinctive to allow clinical diagnosis in the absence of laboratory confirmation. Patients should be treated on the basis of clinical findings. A two tier testing algorithm is recommended for laboratory testing. First-tier testing is most often an enzyme-linked immunosorbent assay (ELISA) test which, if positive or equivocal, should be followed by an IgM and IgG Immunoblot. IgM is only considered reliable if tested within the first 30 days after symptom onset. Acute and convalescent testing is useful to determine final diagnosis. Untreated patients who remain seronegative despite having symptoms for 6-8 weeks are unlikely to have Lyme disease, and other potential diagnoses should be actively pursued. 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 https://www.idsociety.org/uploadedfiles/idsa/guidelines-patient_care/pdf_library/lyme%20disease.pdf

During 2009 and 2010, IDSA convened a special review of the clinical practice guidelines on Lyme disease to determine whether the 2006 guidelines should be revised and updated. A central question explored at the Review Panel hearing held during July 2009 was whether Lyme disease can persist as a chronic infection that can be successfully treated with an extended course of antibiotics.

The special panel reviewed the medical and scientific literature as well as material submitted by the 18 individuals who testified at the hearing and about 150 other comments submitted by the public. The panel also heard from several representatives of the International Lyme and Associated Diseases Society (ILADS), who argued for more extensive treatment for what ILADS identifies as chronic Lyme disease. The panel met 16 times and the review took more than a year to complete. On April 22, 2010 the special Review Panel “unanimously agreed that no changes need be made to the 2006 Lyme disease treatment guidelines developed by the Infectious Diseases Society of America (IDSA)” (https://www.idsociety.org/uploadedfiles/idsa/guidelines-patient_care/pdf_library/lyme%20disease.pdf).

“The Review Panel concurred that all of the recommendations from the 2006 guidelines are medically and scientifically justified in light of the evidence and information provided, including the recommendations that are most contentious: that there is no convincing evidence for the existence of

chronic Lyme infection; and that long-term antibiotic treatment of “chronic Lyme disease” is unproven and unwarranted. This recommendation is also supported by federal CDC. Inappropriate use of antibiotics (especially given intravenously) has been shown to lead to deadly blood infections, serious drug reactions and *C. difficile* diarrhea, as well as the creation of antibiotic-resistant bacteria or “superbugs.” (https://www.idsociety.org/uploadedfiles/idsa/guidelines-patient_care/pdf_library/lyme%20disease.pdf).

III. A Summary or bibliography of peer reviewed medical literature and studies related to the 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.

The Infectious Disease Society of America (IDSA) continues to provide leadership in setting the standard for clinical practice guidelines on Lyme disease.

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A bibliography of peer reviewed journal articles published in 2017, as related to these clinical guidelines and other topics of interest, is included in [Appendix 4](#). Maine CDC reviews these journal articles to maintain an understanding of the current research and literature available on Lyme disease clinical management and treatment.

IV. The education, training, and guidance provided by Maine Center for Disease Control and Prevention to health care 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. Surveillance for tickborne diseases, including Lyme disease, is performed by the Division of Disease Control, Infectious Disease Program, as Lyme disease is a notifiable disease entity 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 of participating hospital emergency department (ED) patient visit data, patients that complain of a tick bite are identified. An increase in ED visits for tick bites is usually a precursor for the typical seasonal increase in Lyme disease incidence. A comparison of 2016 and 2017 data is included as [Appendix 5](#). Maine CDC partners with the University of Maine Cooperative Extension Office to monitor the identification of deer ticks in Maine through a passive submission system.

A spatial analysis of 2017 Lyme disease surveillance data was performed at the county level, showing the continual disease progression ([Appendix 6](#)). Outreach and education to clinicians and other healthcare providers to increase provider response to required supplemental clinical and laboratory information is ongoing.

Maine CDC epidemiologists provide consultation to the medical community on tickborne diseases, 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. Ongoing educational initiatives are featured on the Maine CDC web site: <http://www.maine.gov/lyme>

During 2017, a **clinical management guide**, “Physician’s Reference Manual: Tickborne Diseases in Maine” was mailed to hospitals, urgent care providers, and geriatric practices. This guide includes information on ticks found in Maine and signs/symptoms, laboratory services, diagnosis, and treatment of six tickborne diseases, including Lyme disease.

- 101 copies of this guide were distributed in 2017

Maine CDC continues to contribute to **national surveillance and prevention activities**. During 2017, Maine CDC epidemiologists represented the State at both local and national meetings including:

- Northeastern Tickborne Disease meeting for High Incidence States held in Manchester, NH in March 2017
- Council of State and Territorial Epidemiologist (CSTE) annual conference held Boise, ID in June 2017
- Northeast Epidemiology annual conference held in Northampton, Massachusetts in October 2017
- Council of State and Territorial Epidemiologists (CSTE) Vectorborne Regional Meeting held in Arlington, VA in November 2017

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 2017, Maine CDC epidemiologists provided consultation to the public on tickborne diseases, offering educational and preventive information as needed. Maine CDC epidemiologists present educational outreach activities and seminars on tickborne disease prevention to the general public including:

- 36 presentations or displays held for: students in 3rd-8th grade, Boy Scouts of America, public works employees, forestry department summer workers, health and physical education teachers, mill workers, health care providers, Department of Transportation staff, seniors, and the general public.
- Numerous media interviews given by Maine CDC employees (vectorborne epidemiologist, state health officer, and state epidemiologist).

Maine CDC’s Vectorborne Epidemiologist chairs the State **Vectorborne Disease Work Group**; a group comprised of both State agencies and private entities, which 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 7](#). **Educational efforts** by the Vectorborne Work Group included:

- Presentations given on ticks and Lyme disease
- Presence at vendor shows, television and radio interviews
- Distribution of educational materials including Lyme brochures, tick spoons, fact sheets, etc.

Report to Maine Legislature

Lyme and other Tickborne Illnesses

January, 2018

Submitted by
Maine Department of Health and Human Services, Maine Center for
Disease Control and Prevention (Maine CDC), Division of Disease Control,
Infectious Disease Program

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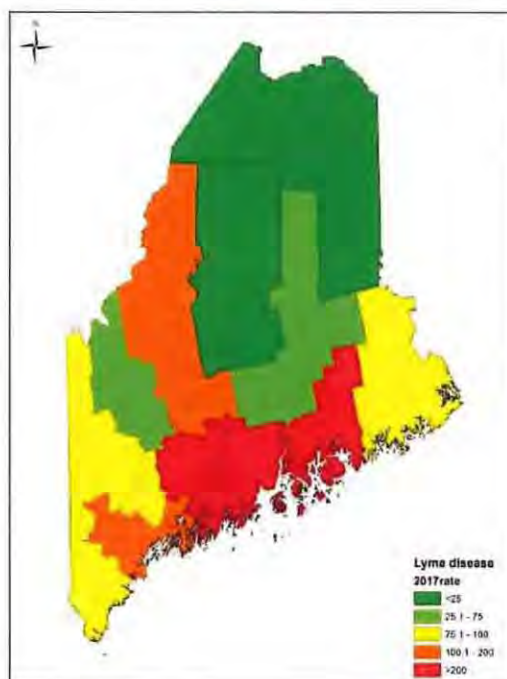
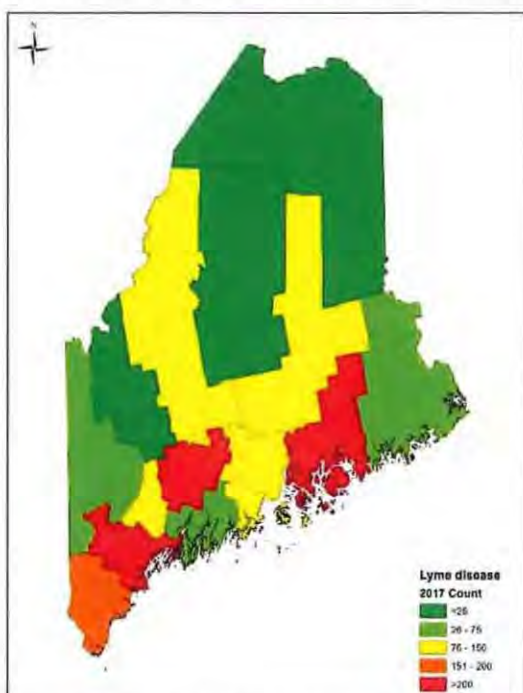
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Confirmed and Probable Cases of Lyme Disease – Maine 2017*

Lyme Disease Cases per 100,000 persons (Rate) – Maine 2017*



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

A. Lyme disease

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Reported Cases of Lyme Disease -- United States, 2016



1 dot placed randomly within county of residence for each confirmed case

Source: federal CDC (https://www.cdc.gov/lyme/resources/reportedcasesoflymedisease_2016.pdf)

The first documented case of Maine-acquired Lyme disease was diagnosed in 1986. The current 2017 numbers are an increase from previous years and will continue to rise as more reports are returned to Maine CDC. In the 1990's the great majority of Lyme disease cases occurred among residents of south coastal Maine, principally in York County. Disease incidence remains high in the southern and the Mid-Coast areas but is starting to increase in the northern and western counties as well, making the problem statewide. Androscoggin, Aroostook, Franklin, Hancock, Kennebec, Knox, Oxford, Penobscot, Piscataquis, Somerset, Waldo, and Washington counties rates increased from 2016 to 2017. Seven counties have rates of Lyme disease higher than the State rate (Hancock, Kennebec, Knox, Lincoln, Sagadahoc, Somerset, and Waldo).

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Forty-one percent (41%) of cases were female and fifty-nine percent (59%) of cases were male. The median age of cases in 2017 was 53 years of age (average age of 46 years). The age at diagnosis ranged from 1-99 years. Sixty-eight percent (68%) of the cases with a known onset date had onset during June, July, or August (date of onset is missing for 17% of cases). Providers reported 58 persons (3% of all cases) were hospitalized with Lyme disease. For further Lyme disease statistics in Maine please see [Appendix 1](#).

B. Other Tickborne Diseases in Maine

Anaplasmosis:

Anaplasmosis is a disease caused by the bacteria *Anaplasma phagocytophilum* which infects white blood cells (neutrophils). Anaplasma was previously known as human granulocytic ehrlichiosis (HGE) or human granulocytic anaplasmosis (HGA) but was renamed in 2003 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. Encephalitis/ meningitis may occur but is rare. Anaplasmosis is transmitted to a person through the bite of an infected deer tick (*Ixodes scapularis*). Preliminary data as of January 16, 2017 showed 662 cases of anaplasmosis reported in 2017, a 78% increase from the 372 cases in 2016. Cases occurred in Androscoggin, Cumberland, Franklin, Hancock, Kennebec, Knox, Lincoln, Oxford, Penobscot, Sagadahoc, Somerset, Waldo, Washington, and York counties. 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 (*Ixodes scapularis*). Signs of babesiosis usually range from no symptoms (asymptomatic) to serious disease. Common symptoms include extreme fatigue, aches, fever, chills, sweating, dark urine, and possibly anemia. People who are infected generally make a full recovery as long as they have a healthy spleen and do not have other diseases that prevent them from fighting off infections. Preliminary data as of January 16, 2017 showed 117 cases of babesiosis reported in 2017, which is an increase from the 82 cases in 2016. Cases occurred in Androscoggin, Cumberland, Hancock, Kennebec, Knox, Lincoln, Oxford, Penobscot, Piscataquis, Sagadahoc, Somerset, Waldo, and York counties. For further babesiosis disease statistics in Maine please see [Appendix 2](#).

Borrelia miyamotoi:

Borrelia miyamotoi is a species of spiral-shaped bacteria 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, *B. miyamotoi* has now been detected in two species of North American ticks, the black-legged or "deer" tick (*Ixodes scapularis*) and the western black-legged tick (*Ixodes pacificus*). Individuals with this infection are likely to have fever, chills, and headache. Other common symptoms include joint pain and fatigue. Unlike Lyme disease, rash is uncommon. Although *Borrelia miyamotoi* is not nationally notifiable, federal CDC in association with endemic states developed a standardized case classification to help standardize reporting and understand the prevalence in the United States. Preliminary data as of January 16, 2017 showed six cases with *Borrelia miyamotoi* infections in Maine. Cases occurred in Androscoggin, Cumberland, Knox, Lincoln, and Sagadahoc counties.

Ehrlichiosis:

Ehrlichiosis is a disease caused by the bacteria *Ehrlichia chaffeensis* which infects white blood cells (monocytes). Ehrlichia was previously known as human monocytic ehrlichiosis (HME). Signs and symptoms of ehrlichiosis include: fever, headache, nausea, and body aches. Encephalitis/ meningitis may occur. Ehrlichiosis is transmitted to a person through the bite of an infected lone star tick (*Amblyomma americanum*). Ehrlichiosis is uncommon in Maine as the tick is not commonly found here. However, this may be a disease to watch for as the tick appears to be moving north. Preliminary data as of January 16, 2017 showed ten probable cases of *Ehrlichia chaffeensis* reported in 2017 from Androscoggin, Cumberland, Kennebec, Somerset, and York counties. Maine had ten probable cases of Ehrlichia/Anaplasma Undetermined in 2017, which occurs when serologies are done, but titers are the same for both Ehrlichia and Anaplasma so we cannot tell which organism was present. For further ehrlichiosis disease statistics in Maine please see [Appendix 2](#).

Powassan:

Powassan is a virus transmitted to humans through the bite of an infected woodchuck tick (*Ixodes cookei*) or deer tick (*Ixodes scapularis*). It is the only tickborne arbovirus occurring in the United States and Canada. Approximately 100 cases of Powassan were reported in the United States in the last decade, and cases appear to be increasing. Signs and symptoms of Powassan include fever, headache, vomiting, weakness, confusion, seizures, and memory loss. Long-term neurologic problems may occur. There were three reported cases of Powassan in Maine in 2017. One case was reported in Cumberland county and two cases were reported in Knox county. With the two cases reported in late spring, Maine CDC put together a Powassan fact sheet to inform the public about their risk. This is included as [Appendix 3](#).

Spotted Fever Rickettsiosis:

Spotted Fever Rickettsioses (SFR) are a group of bacterial illnesses, the most common of which is Rocky Mountain Spotted Fever (RMSF). Signs and symptoms of RMSF include fever, chills, headache, gastrointestinal symptoms, and a maculopapular rash often on the palms and the soles. RMSF is transmitted to a person through the bite of an infected dog tick (*Dermacentor variabilis*). RMSF is not known to be endemic in Maine, but could become an emerging disease. Preliminary data as of January 16, 2017 showed three probable cases of SFR reported in 2017. These cases were reported in Androscoggin and York counties. For further SFR disease statistics in Maine please see [Appendix 2](#).

Other Emerging Tickborne Diseases:

Federal CDC and other researchers are continually on the watch for new or emerging tickborne disease. Pathogens identified in the last few years include Heartland virus, and Bourbon virus. Maine has no documented cases of any of these diseases, but there is serological evidence (from either humans or wild animals) of Heartland virus in Maine, so these are diseases to watch.

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 Center for Disease Control and Prevention 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:

https://www.idsociety.org/uploadedfiles/idsa/guidelines-patient_care/pdf_library/lyme%20disease.pdf

Lyme disease is diagnosed clinically with the aid of laboratory testing. An erythema migrans in an endemic area is sufficiently distinctive to allow clinical diagnosis in the absence of laboratory confirmation. Patients should be treated on the basis of clinical findings. A two tier testing algorithm is recommended for laboratory testing. First-tier testing is most often an enzyme-linked immunosorbent assay (ELISA) test which, if positive or equivocal, should be followed by an IgM and IgG Immunoblot. IgM is only considered reliable if tested within the first 30 days after symptom onset. Acute and convalescent testing is useful to determine final diagnosis. Untreated patients who remain seronegative despite having symptoms for 6-8 weeks are unlikely to have Lyme disease, and other potential diagnoses should be actively pursued. 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 https://www.idsociety.org/uploadedfiles/idsa/guidelines-patient_care/pdf_library/lyme%20disease.pdf

During 2009 and 2010, IDSA convened a special review of the clinical practice guidelines on Lyme disease to determine whether the 2006 guidelines should be revised and updated. A central question explored at the Review Panel hearing held during July 2009 was whether Lyme disease can persist as a chronic infection that can be successfully treated with an extended course of antibiotics.

The special panel reviewed the medical and scientific literature as well as material submitted by the 18 individuals who testified at the hearing and about 150 other comments submitted by the public. The panel also heard from several representatives of the International Lyme and Associated Diseases Society (ILADS), who argued for more extensive treatment for what ILADS identifies as chronic Lyme disease. The panel met 16 times and the review took more than a year to complete. On April 22, 2010 the special Review Panel “unanimously agreed that no changes need be made to the 2006 Lyme disease treatment guidelines developed by the Infectious Diseases Society of America (IDSA)” (https://www.idsociety.org/uploadedfiles/idsa/guidelines-patient_care/pdf_library/lyme%20disease.pdf).

“The Review Panel concurred that all of the recommendations from the 2006 guidelines are medically and scientifically justified in light of the evidence and information provided, including the recommendations that are most contentious: that there is no convincing evidence for the existence of

chronic Lyme infection; and that long-term antibiotic treatment of “chronic Lyme disease” is unproven and unwarranted. This recommendation is also supported by federal CDC. Inappropriate use of antibiotics (especially given intravenously) has been shown to lead to deadly blood infections, serious drug reactions and *C. difficile* diarrhea, as well as the creation of antibiotic-resistant bacteria or ‘superbugs.’” (https://www.idsociety.org/uploadedfiles/idsa/guidelines-patient_care/pdf_library/lyme%20disease.pdf).

III. A Summary or bibliography of peer reviewed medical literature and studies related to the 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.

The Infectious Disease Society of America (IDSA) continues to provide leadership in setting the standard for clinical practice guidelines on Lyme disease.

https://www.idsociety.org/uploadedfiles/idsa/guidelines-patient_care/pdf_library/lyme%20disease.pdf.

A bibliography of peer reviewed journal articles published in 2017, as related to these clinical guidelines and other topics of interest, is included in [Appendix 4](#). Maine CDC reviews these journal articles to maintain an understanding of the current research and literature available on Lyme disease clinical management and treatment.

IV. The education, training, and guidance provided by Maine Center for Disease Control and Prevention to health care 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. Surveillance for tickborne diseases, including Lyme disease, is performed by the Division of Disease Control, Infectious Disease Program, as Lyme disease is a notifiable disease entity 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 of participating hospital emergency department (ED) patient visit data, patients that complain of a tick bite are identified. An increase in ED visits for tick bites is usually a precursor for the typical seasonal increase in Lyme disease incidence. A comparison of 2016 and 2017 data is included as [Appendix 5](#). Maine CDC partners with the University of Maine Cooperative Extension Office to monitor the identification of deer ticks in Maine through a passive submission system.

A spatial analysis of 2017 Lyme disease surveillance data was performed at the county level, showing the continual disease progression ([Appendix 6](#)). Outreach and education to clinicians and other healthcare providers to increase provider response to required supplemental clinical and laboratory information is ongoing.

Maine CDC epidemiologists provide consultation to the medical community on tickborne diseases, 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. Ongoing educational initiatives are featured on the Maine CDC web site: <http://www.maine.gov/lyme>

During 2017, a **clinical management guide**, “Physician’s Reference Manual: Tickborne Diseases in Maine” was mailed to hospitals, urgent care providers, and geriatric practices. This guide includes information on ticks found in Maine and signs/symptoms, laboratory services, diagnosis, and treatment of six tickborne diseases, including Lyme disease.

- 101 copies of this guide were distributed in 2017

Maine CDC continues to contribute to **national surveillance and prevention activities**. During 2017, Maine CDC epidemiologists represented the State at both local and national meetings including:

- Northeastern Tickborne Disease meeting for High Incidence States held in Manchester, NH in March 2017
- Council of State and Territorial Epidemiologist (CSTE) annual conference held Boise, ID in June 2017
- Northeast Epidemiology annual conference held in Northampton, Massachusetts in October 2017
- Council of State and Territorial Epidemiologists (CSTE) Vectorborne Regional Meeting held in Arlington, VA in November 2017

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 2017, Maine CDC epidemiologists provided consultation to the public on tickborne diseases, offering educational and preventive information as needed. Maine CDC epidemiologists present educational outreach activities and seminars on tickborne disease prevention to the general public including:

- 36 presentations or displays held for: students in 3rd-8th grade, Boy Scouts of America, public works employees, forestry department summer workers, health and physical education teachers, mill workers, health care providers, Department of Transportation staff, seniors, and the general public.
- Numerous media interviews given by Maine CDC employees (vectorborne epidemiologist, state health officer, and state epidemiologist).

Maine CDC’s Vectorborne Epidemiologist chairs the State **Vectorborne Disease Work Group**; a group comprised of both State agencies and private entities, which 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 7](#). **Educational efforts** by the Vectorborne Work Group included:

- Presentations given on ticks and Lyme disease
- Presence at vendor shows, television and radio interviews
- Distribution of educational materials including Lyme brochures, tick spoons, fact sheets, etc.

In 2014, Maine CDC began a project with **students in 3rd to 5th grade to teach them about tick biology and ecology**, as well as present information on tickborne diseases and prevention. In 2017 Maine CDC expanded the program to include curriculum and activities developed for middle schools. The program consists of a pre-test to gauge knowledge prior to the intervention; a twenty minute PowerPoint presentation on tick biology and ecology, as well as disease information; four ten-minute interactive activities; a take-home packet with games, activities, and information for parents; and a post-test to determine changes in knowledge and practices. This was undertaken with the Maine Public Health Corps (PHC) students who designed the curriculum and assisted with the activities. An epidemiologist or PHC member presented the disease and biology/ecology information. Participants evaluated the program highly in all schools. This endeavor is being undertaken in close partnership with the Maine Department of Education. An example of one of the newly developed middle school activities can be found in [Appendix 8](#).

Educational materials for the 3rd-5th and 6th-8th graders are available online, including our educator's guide, group activities, and activity book for both ticks and mosquitoes. PHC continues to review and update the education materials. Educational materials are available online at: <http://www.maine.gov/dhhs/mecdc/infectious-disease/epi/school-curriculum/index.shtml>.

- The web resource for educators was visited 1,481 times in 2017

In 2017, Maine CDC and PHC expanded the Tick Free ME program which **educates adults ages 45 years and older about ticks and tick prevention practices**. In 2017 Maine CDC conducted the Tick Free ME program entirely online. The program consisted of a questionnaire administered prior to participation to gauge prior knowledge and tick prevention behaviors and to gather contact information. During the challenge month participants received fact sheets on tickborne diseases in Maine (Lyme disease, *Anaplasma*, *Babesia*, and *Powassan*), repellent, and other tick prevention methods, and videos about tick habitats, diseases, and prevention. PHC members used weekly surveys to measure participant's prevention behaviors each week.

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

- How to Perform a Tick Check – viewed 753 times in 2017
- Tickborne Diseases in Maine: Anaplasmosis – viewed 442 times in 2017
- Tickborne Diseases: Powassan Encephalitis– viewed 411 times in 2017
- Tickborne Diseases in Maine: Lyme Disease-viewed 137 times in 2017
- Reducing Tick Habitat Around Your Home- viewed 259 times in 2017
- Tickborne Diseases in Maine : Babesiosis – viewed 135 times in 2017
- How to Choose a Residential Pesticide Applicator – viewed 45 times in 2017
- Tick Identification – viewed 6,421 times in 2017
- Choosing and Applying Personal Repellents – viewed 79 times in 2017

Maine's PHC team conducts Tick and Mosquito **"Train the Trainer" events** to help educate individuals on these topics and empower them to be a resource in their local community. During 2017 PHC held six workshops in Portland, Lisbon Falls, Ellsworth, Rockland, Falmouth, and Wells and provided training and materials to 126 participants.

Maine CDC's Lyme disease website is continually updated to provide information to the public and to health professionals about Lyme disease in Maine. In 2017:

- The Lyme disease homepage was visited 3,046 times
- The tick identification page was visited 7,143 times
- The FAQ section was visited 35,416 times

Ongoing educational initiatives featured on the Maine CDC website include:

- Lyme disease fact sheets
- Tick Identification
- Prevention of Tickborne Diseases
- Lyme Disease Surveillance Reports from 2008-2016
- Lyme disease awareness and prevention movie

Links are also provided for the educational materials for educators and the 3rd-5th and 6th-8th grade curriculum, and for other tickborne diseases including: anaplasmosis, babesiosis, ehrlichiosis, Powassan, and RMSF.

During 2017, **Lyme disease educational materials** were distributed to partners and members of the public. Approximate numbers of materials distributed include:

- ~14,926 Wallet-sized laminated tick identification cards
- ~10,973 Tick remover spoons
- ~3,415 Lyme disease brochures
- ~3,169 Tick ID posters
- ~745 Tick Bite Follow Up posters ([Appendix 9](#))
- ~612 Lyme Disease Awareness Month 2017 posters

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 (www.mainepublichealth.gov). Official releases in 2017 included:

- 2017 Lyme and other Tickborne Disease Information (Health Alert) – May 2nd
- Two Cases of Powassan Encephalitis Identified in Maine Residents (Press Release) – released June 1st
- Be Tick Smart: Maine CDC Names the Winners of the 2017 Lyme Disease Awareness Poster Contest (Press Release) – released June 13th
- Adults Over 65 Years Old Had the Highest Rates of Lyme Disease in 2016 (Press Release) – released June 15th
- Tick Bite Recommendations (Health Alert) – June 15th

Pursuant to Legislation enacted in the second regular session of the 126th Legislature, May 2017 was declared to be **Lyme Disease Awareness Month** (PL 494). Educational activities took place the entire month including:

- Press release/Health Alert
- Governor's Proclamation of Lyme Disease Awareness Month ([Appendix 10](#))
- Information distributed through social media (Facebook, Twitter, Blog)

- Information distributed through multiple newsletters throughout the state
- Lyme Disease Public Awareness Events held in Augusta, Freeport, Fryeburg, Kennebunkport, and Wiscasset
- Presentations throughout the state
- Maine CDC presence at multiple health fairs and conferences

Another major Lyme Disease Awareness month activity was the **statewide poster contest** for students in grades K-8. Students were asked to create a poster with the theme “**Be Tick Smart**” 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 two honorable mentions are available for viewing at the Lyme disease website www.maine.gov/lyme. Maine CDC used one of the winning posters for our 2017 statewide educational campaign ([Appendix 11](#)). Maine CDC distributed this poster to schools, state parks, the board of tourism, and historical sites.

In 2011 Maine CDC launched Lyme disease data on the **Maine Tracking Network Portal**. The data portal allows users to customize their data inquiries and includes data from 2001-2016, including town level data. The Lyme portion of the portal was accessed 3,159 times during 2017. The Maine Tracking Network Lyme Data are available on Maine CDC’s website at www.maine.gov/idepi. Please see [Appendix 12](#) for a sample table and map. Data can be broken down by:

- Public Health District
- County
- Town
- 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, use of 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 have been 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.

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 disease can be found in [Appendix 13](#).

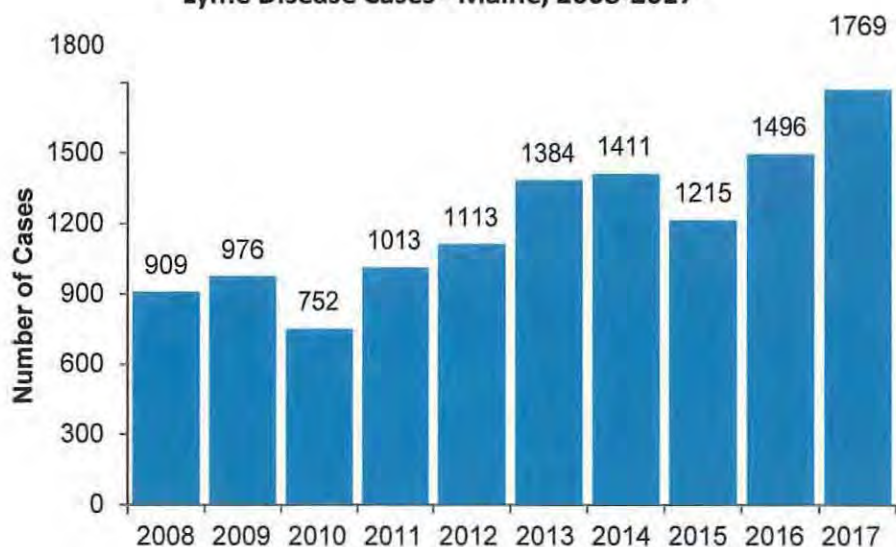
Appendix 1 Maine Lyme disease statistics

Number and Rate per 100,000 persons of Lyme Disease Cases by County of Residence – Maine, 2013-2017*

County	2013 Count	2013 Rate	2014 Count	2014 Rate	2015 Count	2015 Rate	2016 Count	2016 Rate	2017* Count	2017* Rate
Androscoggin	72	66.9	95	88.4	51	47.6	92	85.8	95	88.5
Aroostook	3	4.3	5	7.2	2	2.9	1	1.5	7	10.3
Cumberland	351	123	339	117.8	258	89.0	311	107.2	303	103.8
Franklin	11	36.1	10	33	10	33.3	3	10.0	22	73.3
Hancock	100	182.3	121	221.2	121	221.4	152	278.1	202	371.2
Kennebec	183	151	139	114.8	154	128.4	204	170.0	260	215.6
Knox	95	240.2	106	267.2	119	298.6	107	268.5	139	349.7
Lincoln	71	208.3	83	242.9	74	217.8	99	291.4	71	207.5
Oxford	50	87	43	75.1	26	45.5	43	75.2	57	99.6
Penobscot	38	24.8	50	32.6	51	33.4	90	58.9	111	73.1
Piscataquis	0	0	2	11.7	1	5.9	3	17.7	3	17.8
Sagadahoc	55	157.1	65	185.5	48	136.6	91	258.9	60	170.1
Somerset	32	61.9	17	33.2	28	54.8	21	41.1	91	178.7
Waldo	89	228.6	49	125.5	63	160.9	71	181.3	135	343.0
Washington	13	40.4	14	44	20	63.2	20	63.2	29	92.2
York	221	110.8	272	135.5	184	91.5	188	93.5	184	90.9
State	1384	104.2	1410	106	1210	91.0	1496	112.5	1769	132.4

All data includes both confirmed and probable cases

Lyme Disease Cases - Maine, 2008-2017*

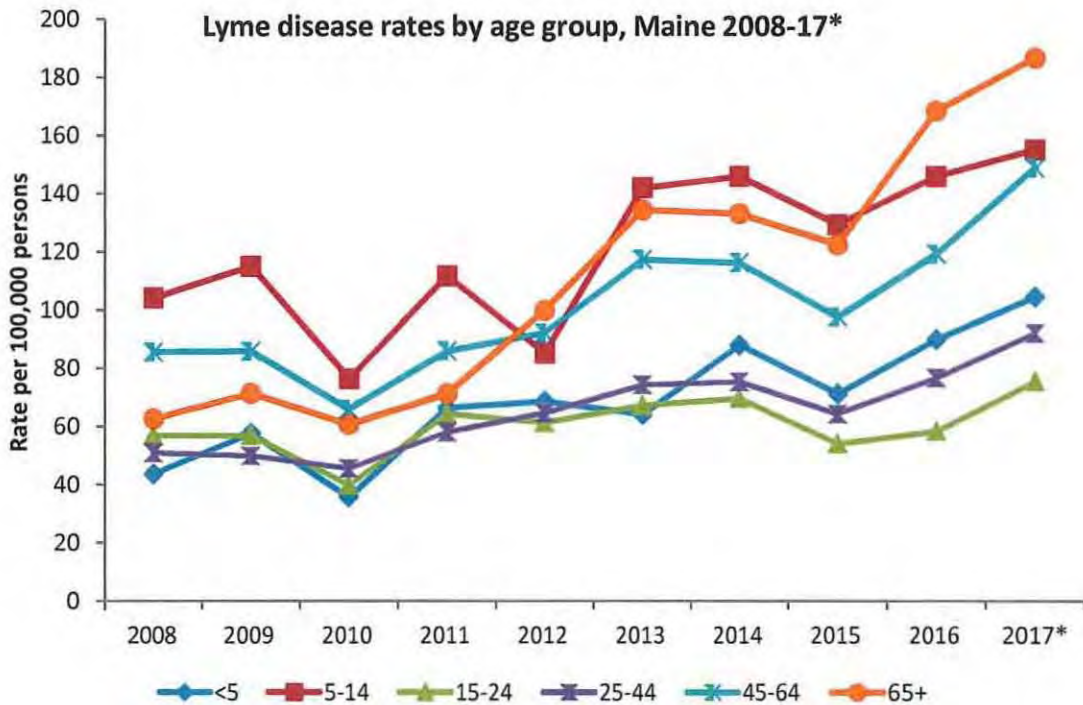


* 2017 data are preliminary as of 01/16/2018

Lyme Disease Incidence - Maine and US, 2008-2017*

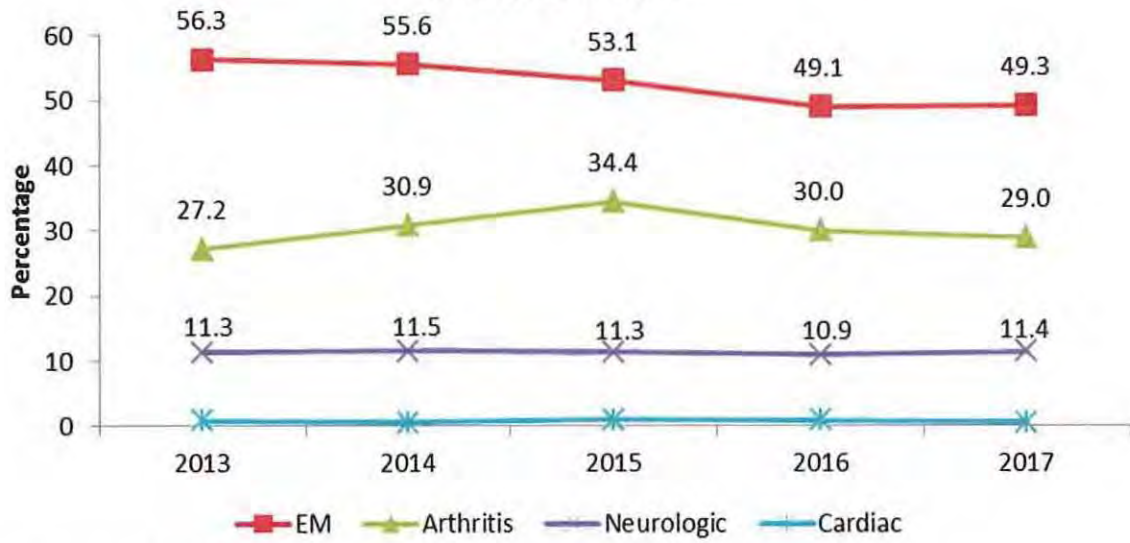


* 2017 data are preliminary as of 01/16/2018



* 2017 data are preliminary as of 01/16/2018

**Percentage of Symptoms Reported Among Lyme Disease Cases -
Maine, 2013-2017***



* 2017 data are preliminary as of 01/16/2018

**Appendix 2
Maine tickborne disease statistics (excluding Lyme disease)**

Number of Selected Tickborne Disease Cases by County of Residence – Maine, 2017*

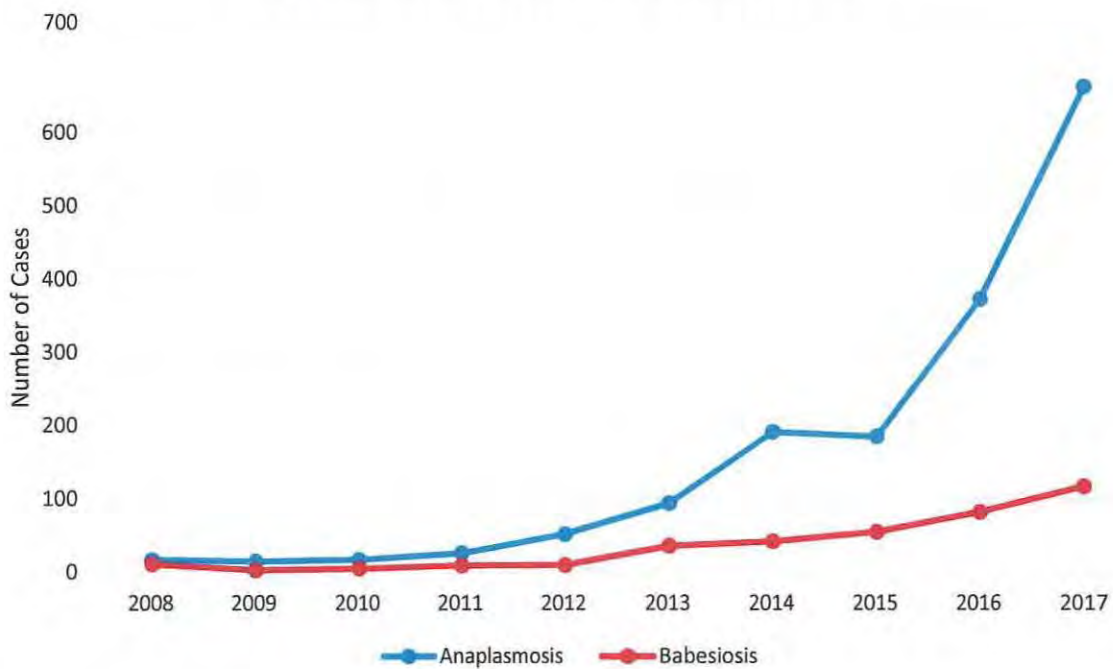
County	Anaplasmosis	Babesiosis	Ehrlichiosis	Ehrlichiosis/ Anaplasmosis Undetermined	Powassan	Spotted Fever Rickettsiosis
Androscoggin	42	6	2	6	0	0
Aroostook	0	0	0	0	0	0
Cumberland	102	20	3	1	1	1
Franklin	1	0	0	0	0	0
Hancock	24	3	0	0	0	0
Kennebec	71	15	2	3	0	0
Knox	110	25	0	0	2	0
Lincoln	95	10	0	0	0	0
Oxford	14	3	0	0	0	1
Penobscot	6	2	0	0	0	0
Piscataquis	0	1	0	0	0	0
Sagadahoc	46	7	0	0	0	0
Somerset	4	2	1	0	0	0
Waldo	38	1	0	0	0	0
Washington	2	0	0	0	0	0
York	107	22	2	0	0	1
Total	662	117	10	10	3	3

Number of Selected Tickborne Disease Cases– Maine, 2008 - 2017*

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017*
Anaplasmosis	17	15	17	26	52	94	191	186	372	662
Babesiosis	11	3	5	9	10	36	42	55	82	117
Ehrlichia chaffeensis	1	1	4	1	3	3	8	5	7	10
Ehr/Ana undetermined	0	0	0	0	0	2	6	1	4	10
RMSF	1	5	2	1	3	2	3	1	4	3
Powassan	0	0	0	0	0	1	0	0	1	3

* 2017 data are preliminary as of 01/16/2018

Anaplasmosis and Babesiosis, Maine 2008-2017*



* 2017 data are preliminary as of 01/16/2018

Appendix 3

Powassan Virus Fact Sheet



Maine Center for Disease
Control and Prevention
An Office of the
Department of Health and Human Services

What is Powassan virus?

Powassan (POW) virus disease is a rare, but often serious disease that is spread by infected ticks. POW virus is one of a group of arthropod-borne viruses (arboviruses) that can cause swelling of the brain (encephalitis).

How is it spread?

POW virus is spread by the bite of an infected tick. POW virus is not passed from person-to-person.

What are the symptoms?

Many people who become infected do not develop any symptoms. POW virus can cause swelling of the brain and meninges (the membranes that surround the brain and spinal cord). Symptoms can include fever, headache, vomiting, weakness, confusion, loss of coordination, speech difficulties, and seizures.

Who is at risk for infection?

Anyone bitten by a tick in an area where the virus is found can get infected with POW virus. The risk is highest for people who live, work or play in brushy or wooded areas, because of greater exposure to potentially infected ticks.

How soon do people infected get sick?

The time from tick bite to onset of illness ranges from one week to one month.

How is it diagnosed?

Diagnosis is based on a combination of signs and symptoms and laboratory tests of blood or spinal fluid.

What is the treatment?

There is no specific medicine to cure or treat POW virus disease. Treatment for severe illnesses may

include hospitalization, respiratory support, and fluids.

Is there a vaccine?

No, currently there is no vaccine available to prevent POW.

How can I reduce the chance of getting infected?

The best way to prevent POW virus disease is by protecting yourself from tick bites.

- Avoid contact with ticks by avoiding wooded and bushy areas with high grass.
- Apply repellents to bare skin, according to label instructions.
 - Repellents containing DEET can be applied to exposed skin, but only last a few hours.
 - Clothing and gear can be treated with permethrin, which remains protective through several washings.
- Find and remove ticks before they have a chance to bite and attach.
 - Bathe or shower (preferably within 2 hours after being outdoors) to wash off and find ticks on your body.
 - Conduct a full-body tick check. Parents should thoroughly check children, especially in their hair.
 - Also examine clothing, gear and pets.

Where can I get more information?

For more information contact your healthcare provider or local health center. You can also contact the Maine Center for Disease Control and Prevention by calling 1-800-821-5821 or visiting the website <http://www.maine.gov/idepi>. The federal Centers for Disease Control and Prevention website <http://www.cdc.gov/powassan> is another excellent source of health information.

Appendix 4

Peer-reviewed medical literature related to medical management and treatment of Lyme disease – bibliography: 2017

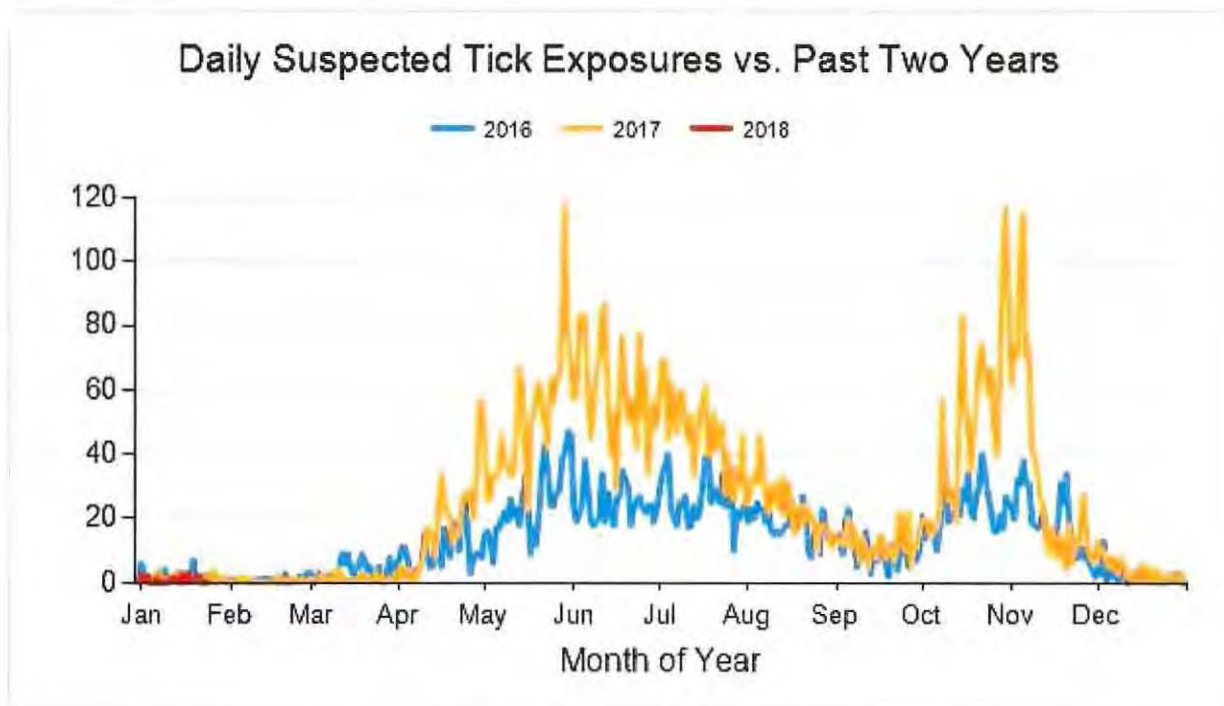
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Appendix 5

Maine CDC *Syndromic Surveillance Report*

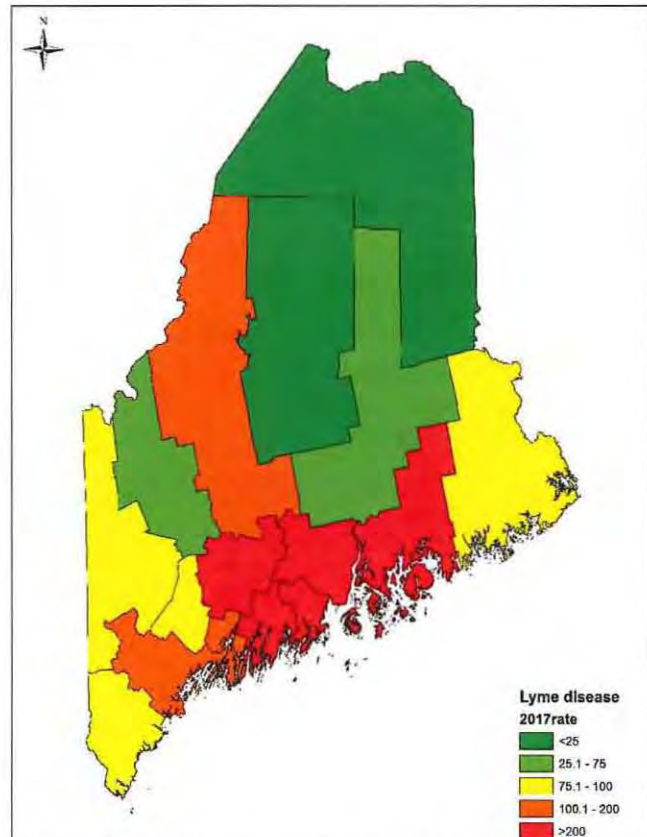
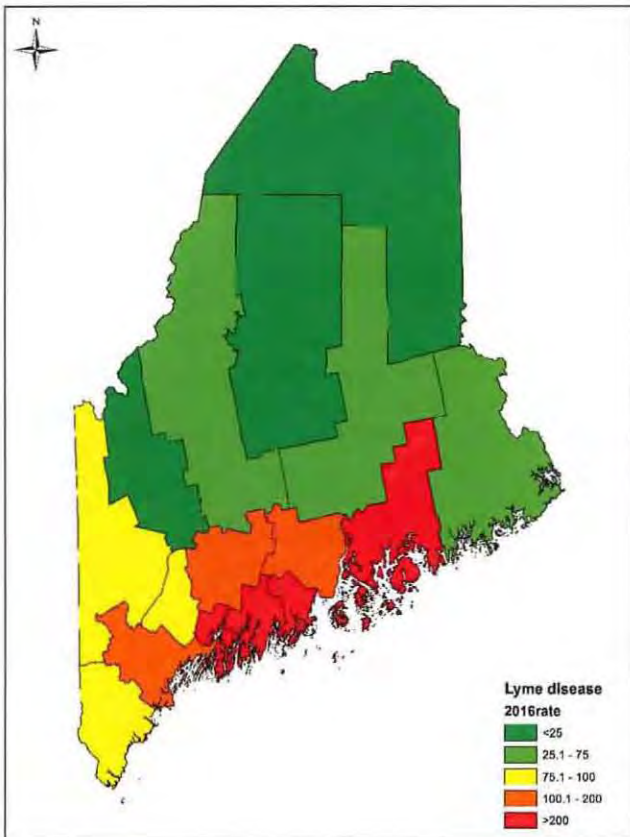
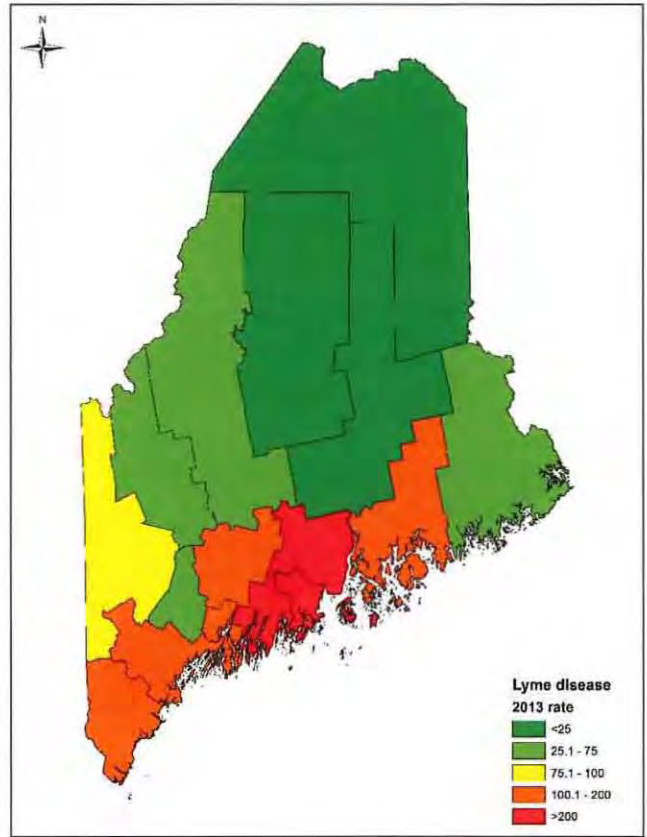
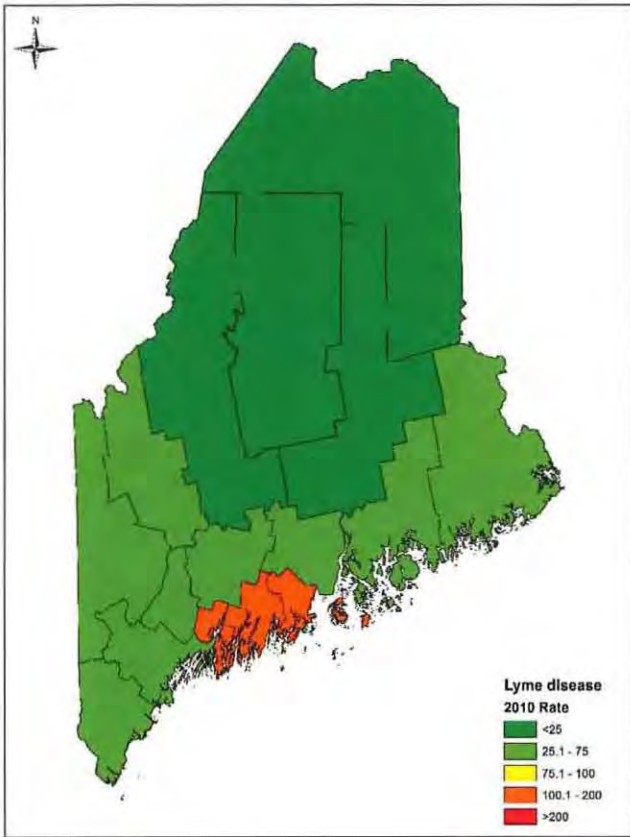
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Data Notes:

The number of suspected tick exposures is based on automated processing of chief complaint text from patient encounters at Maine emergency departments and affiliated urgent care facilities. New hospitals are added to the syndromic surveillance system every year, increasing the universe of patient encounters and confounding year-over-year comparisons. For more information about Maine's syndromic surveillance data and methods, please contact syndromic@maine.gov.

Appendix 6
Lyme Disease Cases per 100,000 people (Rate) – Maine, Selected years 2010-2017*



* 2017 data are preliminary as of 01/16/2018

Appendix 7
2017 Maine Vectorborne Disease Work Group

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

Adams, Justin	Municipal Pest Management
Beausang, Beth	Chellie Pingree's Staff
Bennett, Siiri	Maine CDC
Bergeron, Justin	Maine Department of Agriculture, Conservation, and Forestry
Bonthius, Jessica	Maine CDC
Camuso, Judy	Maine Department of Inland Fisheries and Wildlife
Chamberlain, Anne	Maine Board of Pesticide Control
Dill, Griffin	Maine Cooperative Extension
Dill, Jim	Maine Cooperative Extension
Donahue, Charlene	Maine Forest Service
Dyer, Robin	US Department of Agriculture
Elias, Susan	Maine Medical Center Research Institute, UMaine Orono
Fish, Gary	Maine Board of Pesticides Control
Fiske, Rachael	Maine Department of Agriculture, Conservation, and Forestry
Gardner, Allison	University of Maine Orono
Groden, Ellie	University of Maine Orono
Hicks, Lebelle	Maine Board of Pesticides Control
Hinkel, Bill	Maine Department of Environmental Protection
Jackson Jones, Paula	Midcoast Lyme Disease Support Group
Jennings, Henry	Maine Board of Pesticides Control
Kantar, Lee	Maine Department of Inland Fisheries and Wildlife
Kavanah, Brian W	Maine Department of Environmental Protection
Keenan, Patrick	Biodiversity Research Institute
Lacombe, Eleanor	Maine Medical Center Research Institute
Lay, Cam	Maine Board of Pesticides Control
Lichtenwalner, Anne	University of Maine, Animal Health Laboratory
Lubelczyk, Charles	Maine Medical Center Research Institute
Matluk, Nicholas	Maine Health and Environmental Testing Laboratory
Morris, Jesse W	US Department of Agriculture
Morrison, Mike	Municipal Pest Management
Murray, Kathy	Maine Board of Pesticides Control
Patterson, Megan L	Maine Board of Pesticides Control
Peranzi, Catie	Maine CDC
Poland, Emily	Maine Department of Education
Rand, Peter	Maine Medical Center Research Institute
Ravana, Kyle	Maine Department of Inland Fisheries and Wildlife
Robich, Rebecca	Maine Medical Center Research Institute
Robinson, Sara	Maine CDC
Smith, Rob	Maine Medical Center Research Institute
Staples, Joe	University of Southern Maine
Storch, Dick	University of Maine Cooperative Extension
Struble, Dave	Maine Forest Service
Szantyr, Beatrice	Physician, Lincoln Maine
Tomlinson, Mary	Maine Board of Pesticides Control
Walsh, Michele	Maine Department of Agriculture, Conservation, and Forestry

Webber, Lori
Welch, Margaret
Wood, Greg

Maine CDC
Maine Medical Center Research Institute
Maine Department of Environmental Protection

Appendix 8
Sample 6th-8th Grade Activity

Activity A

Group size is suggested to be ten students or less.

Having parent volunteers or teaching aides may be helpful in the small group setting.

This activity is designed to take approximately ten minutes so students can rotate through each activity.

This game is designed to be played in a large open space.

*This activity was created by 7th grade students from King Middle School in Portland, ME.

Tick Tag



a. **Directions:**



Choose 1 student to be the disease (tagger), and 1 student to be the antibodies (unfreezers); the rest of the students will be cells. The taggers will run around to tag the cells, and if a cell is tagged, then they sit down and wait for an antibody (unfreezer) to come rescue them. The antibodies carry around a list of questions to ask the tagged cells. If the infected cells answer correctly, then they join the antibodies in a conga line to help the other cells. If they answer incorrectly, then they join the disease (taggers) and try to tag other cells. In the end, when there are no more cells, whichever team (disease or antibody) has the most people, wins. Multiple rounds can be played as time allows. Select new students to be the tagger and unfreezer. Make sure the new unfreezer starts where the last one left off in the question list to avoid repeating.



b. **Supplies:**

Questions

c. **Learning Objective:**

  Knowledge of diseases ticks can transmit

  Knowledge of the transmission cycle

  Maine Learning Results in
Health Education: A3, A4

d. **Estimated time:** 10 minutes

Appendix 9 Tick Bite Poster

WHAT SHOULD I DO AFTER A TICK BITE?

FOLLOW THESE TIPS IF YOU FIND A TICK ON YOURSELF OR SOMEONE ELSE:

1. REMOVE THE TICK AS SOON AS POSSIBLE

- Use tweezers or a tick spoon to remove ticks quickly and safely, lift straight up
- Don't worry if the head remains in the skin after removal, the abdomen is the part of the tick that carries disease
- Clean the area around the bite with soap and water or rubbing alcohol



2. IDENTIFY THE TICK IF POSSIBLE

- Dog ticks in Maine are not known to carry human disease
- The University of Maine Cooperative Extension offers a free tick identification service
 - Phone: 207.581.3880 or 800.287.0279 (in Maine)
 - E-mail: tickid@maine.edu



Deer Tick (Blacklegged tick)

- Spot behind head is black

(Please note that these ticks are not pictured to scale.)



Dog Tick

- Spot behind head has white on it

3. MONITOR FOR SYMPTOMS FOR 30 DAYS AFTER A DEER TICK BITE

- Symptoms to monitor:
 - Lyme Disease: bulls eye rash, headache, fever, chills, joint pain.
 - Anaplasmosis: fever, headache, lack of appetite, nausea, muscle pain, vomiting.
 - Babesiosis: fatigue, sweating, dark urine, chills, fever, anemia.
 - Powassan: headache, body ache, fever, vomiting.
- Antibiotics are **not** routinely recommended without symptoms.
- Antibiotics are **not** effective for preventing or treating Powassan.



For more information visit: www.maine.gov/dhhs/mecdc/infectious-disease/epi/vector-borne/index.shtml or scan this QR code ↑

**Appendix 10
2017 Governor's Proclamation**



WHEREAS, the Maine Center for Disease Control and Prevention reported over 1,485 cases of Lyme disease in 2016; and

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

WHEREAS, public awareness and education are necessary for the public to be tick smart by promoting awareness of Lyme disease and other tick-borne illnesses; and

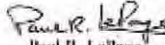
WHEREAS, the 124th Maine Legislature enacted Public Law Chapter 404, L.D. 1709, Item 1, *An Act to Enhance Public Awareness of Lyme Disease*.

NOW, THEREFORE, I, PAUL R. LEPAGE, Governor of the State of Maine, do hereby proclaim the month of May as


LYME DISEASE AWARENESS MONTH

throughout the State of Maine, and urge the public to become aware of the steps that can be taken to reduce the risk of tick-borne illnesses.

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

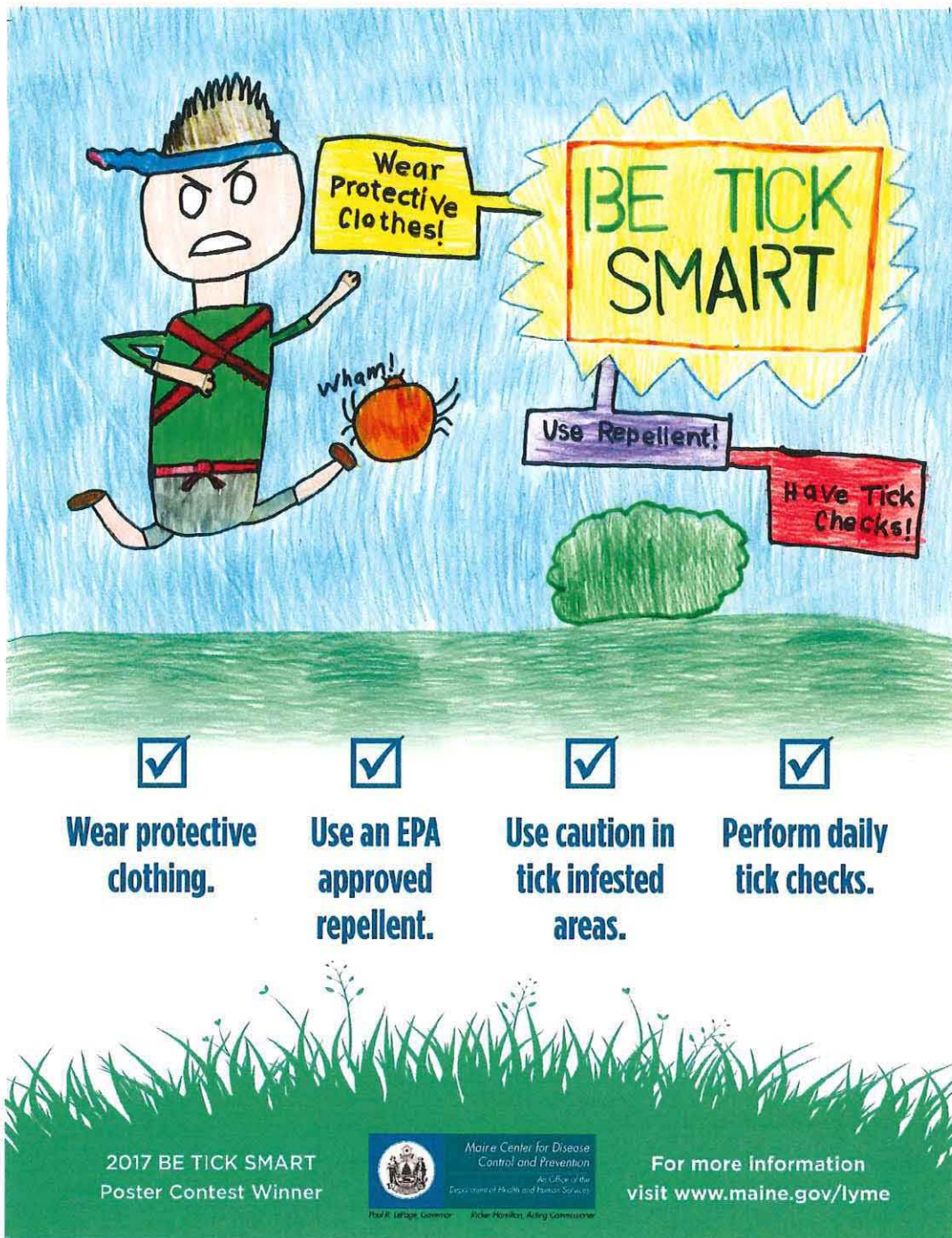

Paul R. LePage
Governor



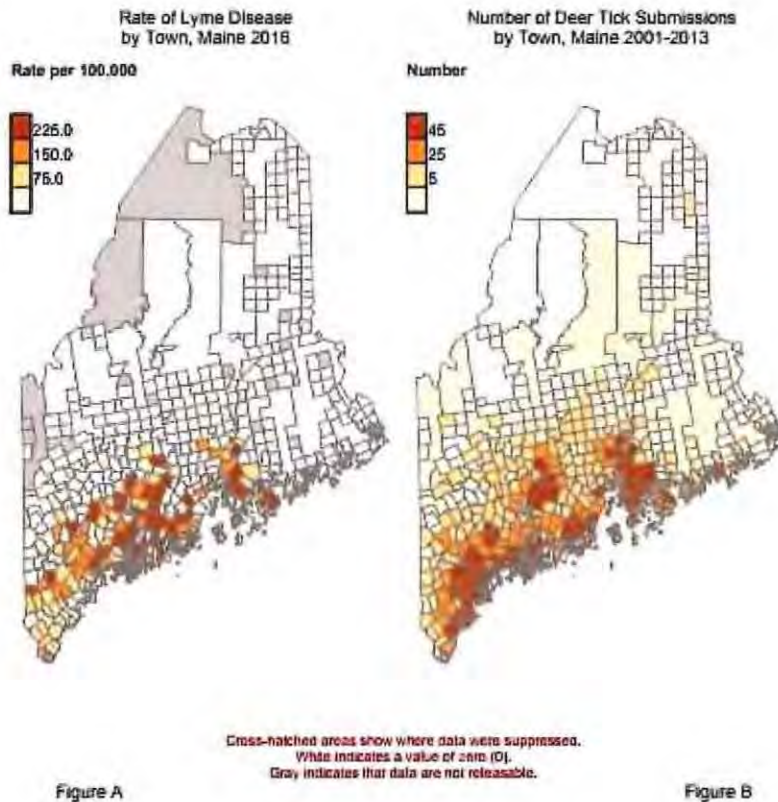

Matthew Dunlap
Secretary of State

TRUE ATTESTED COPY

Appendix 11
Maine CDC Lyme Disease Awareness Month Poster 2017



Appendix 12 Maine Tracking Network: Lyme Disease Data Portal



About these figures

Figure A shows the incidence rate (per 100,000 people) of confirmed and probable cases of Lyme disease in the population. Beginning in 2008, the case definition was expanded to include the classification of probable cases. These data are obtained through notifiable conditions surveillance managed by the Maine CDC Infectious Disease Epidemiology Program, based upon reports from healthcare providers, laboratories, and other healthcare partners.

Figure B shows the number of deer ticks (*Ixodes scapularis*) submitted to the Maine Medical Center Research Institute (MMCRI). From 1988-2013, MMCRI's Vector-borne Disease Laboratory (in cooperation with the State of Maine) offered free tick identification to Maine residents and physicians. Data represent only ticks that were attached to human hosts.

Different map colors are not based on statistical tests of difference.

In order to protect privacy as per Maine CDC Privacy Policy, data may have been suppressed. Locations where data must be suppressed are represented by cross-hatching. Locations where data are not releasable (NR) are shaded gray.

Sources of these data

Figure A: The data were collected and analyzed by the Maine CDC Infectious Disease Epidemiology Program. Population data from the U.S. Census Bureau were used to calculate state, public health district, and county rates of Lyme disease. Population data from the Maine Office of Data, Research, and Vital Statistics (ODRVS) were used to calculate town-level rates of Lyme disease. The data display was prepared by the Maine Environmental Public Health Tracking Program. Data updated: 05/2017. Display updated: 06/2017.

Figure B: MMCRI provided the data for this display. The data were analyzed by the Maine Environmental Public Health Tracking Program. Data updated: 04/2016. Display updated: 04/2016.

Appendix 13
2017 Tickborne Disease Legislation

Connecticut

Title: An Act Designation May as Lyme disease Awareness Month (HB 5102)
Status: Failed

Title: An Act Concerning Standards for Lyme disease Testing (SB 329)
Status: Failed

Delaware

Title: Designating the Month of May 2017 as "Lyme Disease Awareness Month" in the State of Delaware (HCR 24)
Status: Passed

Illinois

Title: Lyme Disease Awareness Month (HR 0350)
Status: Passed

Iowa

Title: Lyme Disease Treatment (HF577)
Status: Passed

Maine

Title: An Act to Require Insurance Coverage for the Diagnosis and Treatment of Lyme disease (H.P. 975)
Status: Failed

Title: Resolve, To Expand Research to Fight Lyme Disease (H.P.0737)
Status: Failed

Massachusetts

Title: An Act Establishing a Special Commission to Find the Best Practices to Promote Education, Awareness, and Prevention of Lyme Disease (S.1255)
Status: Failed

Title: An Act Relative to the Control of Tick-Borne Illness (H.2120)
Status: Passed

New York

Title: Requires health insurers to provide coverage for long term medical care for Lyme disease and other tick borne related pathogens (AB 114; S670)
Status: Failed

Title: An Act directing the department of financial services, in consultation with the commissioner of health, to study and report upon insurance coverage for the treatment of Lyme disease (AB 04863A)
Status: Failed

Title: Relates to grants for graduate medical education in Lyme and tick-borne disease (AB 5501; SB 2621)

Status: Failed

Title: Relates to directing the study and report on providing coverage for Lyme disease treatment (AB 6927)

Status: Failed

Title: Requires the New York state health care quality and cost containment commission to issue a report on coverage for chronic Lyme disease (SB 2168)

Status: Failed

Title: Directs the commissioner of health to establish protocols for the diagnosis and treatment of Lyme disease and other tick borne diseases (SB 6926)

Status: Failed

Pennsylvania

Title: Insurance Coverage for Lyme Disease and Related Tick-Borne Illness (SB 100 P.N. 74)

Status: Failed

Title: A Resolution designating the month of May 2017 as "Lyme Disease Awareness Month" in Pennsylvania (HR 316 P.N. 814)

Status: Passed

Virginia

Title: Lyme disease; treatment of a patient (SB 671)

Status: Passed

Wisconsin

Title: Proclaiming May 2017 as Lyme Disease Awareness Month (SJR45)

Status: Passed

Federal Legislation

Title: Lyme Disease Research Stamp Act (H.R. 4333)

Status: Failed

Title: Tick Identification Pilot Program Act of 2017 (H.R. 3484)

Status: Failed

Title: Tick-Borne Diseases Prevention Act (H.R. 2894)

Status: Failed