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

Paul R. LePage, Governor Mary C. Mayhew, Commissioner

Report to Maine Legislature

Lyme and other Tick-borne Illnesses

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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 Tick-Borne 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 tick-borne illnesses in the state, as well as to address a review and evaluation of Lyme disease and other tick-borne 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 tick-borne 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 tick-borne 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 tick-borne 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 tick-borne 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 tick-borne illnesses based on resources made available by the federal Centers for Disease Control and Prevention or other organizations.

This is the eighth annual report to the Legislature and includes an update on activities conducted during 2015.

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 federal CDC. 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, 2015 (Preliminary data as of January 15, 2016)

- 1,171 confirmed and probable cases

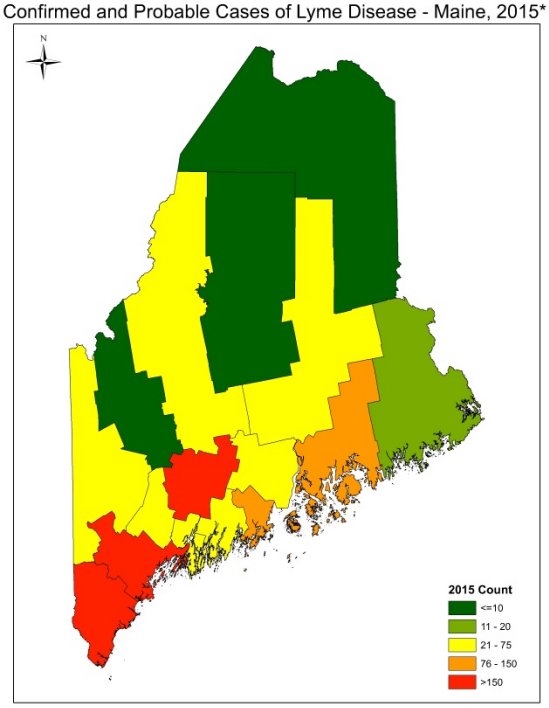
- Symptoms of reported cases* of Lyme disease in Maine included:
  - Erythema Migrans (characteristic expanding rash): 592 cases (51%)
  - Arthritis (joint swelling): 354 cases (30%)
  - Neurological (Bells Palsy or other cranial neuritis): 120 cases (10%)

  * Cases could report more than one symptom

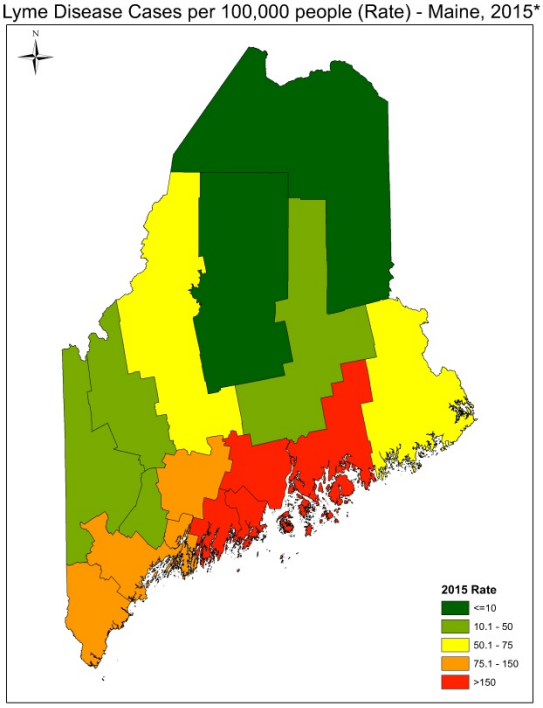
- Hospitalization occurred in 38 cases (3%).

- Among case patients with a reported date of symptom onset, 71% began experiencing symptoms during June, July, or August. Date of symptom onset is missing for 23% of cases.

Confirmed and Probable Cases of Lyme Disease - Maine, 2015*



Lyme Disease Cases per 100,000 people (Rate) - Maine, 2015*



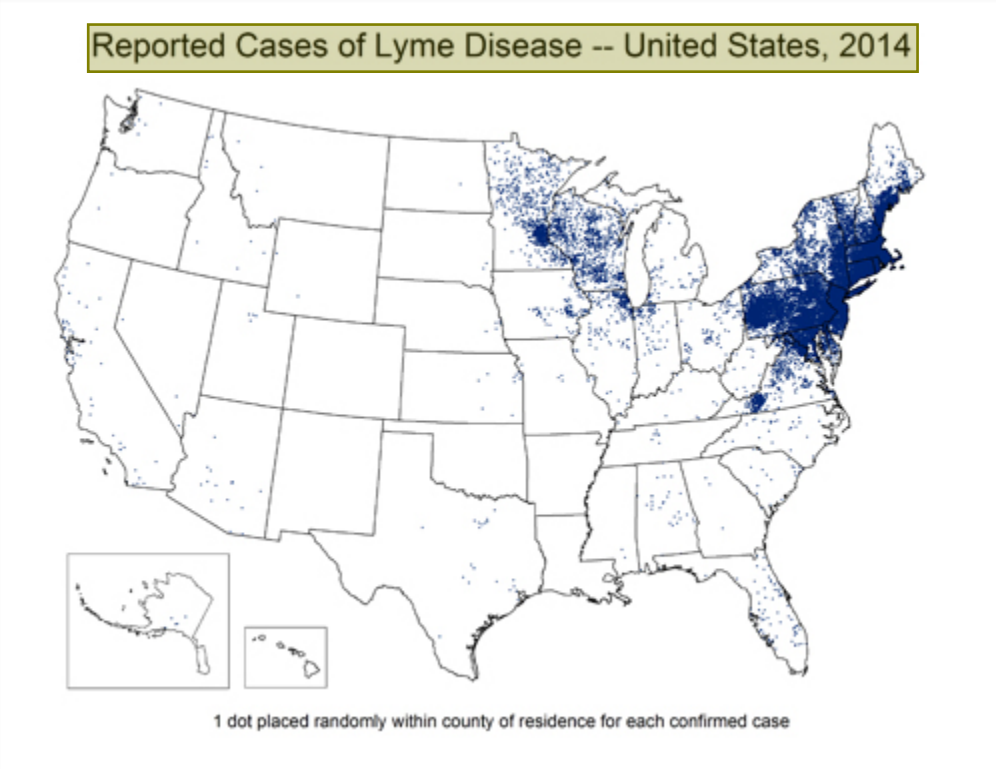
* 2015 data are preliminary as of 01/15/2016

I. The Incidence of Lyme disease and other tick-borne 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.



Source: federal CDC (http://www.cdc.gov/lyme/resources/reportedcasesoflymedisease_2014.pdf)

The first documented case of Maine-acquired Lyme disease was diagnosed in 1986. Since 2003, when 175 cases were confirmed, the numbers of reported cases have increased each year with the exception of 2010. In 2010 there was a slight decrease in cases both in Maine, New England, and the United States, the reasons for which are unknown, but could be attributed to multiple factors including fewer ticks due to weather conditions, and prevention education. The current 2015 numbers are a decrease from previous years, but as Lyme disease reporting is passive there is still time for the case counts to rise. 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. Kennebec, Knox, Somerset, Waldo, and Washington counties rates increased from 2014 to 2015. Seven counties have rates of Lyme disease higher than the State rate (Hancock, Kennebec, Knox, Lincoln, Sagadahoc, Waldo, and York).

In 2015 (preliminary data as of January 15, 2016) 1,171 confirmed and probable cases of Lyme disease were reported among Maine residents, which is a rate of 88.0 cases of Lyme disease per 100,000 persons in Maine. Thirty-seven (37%) percent of reported cases were from the southern counties (Cumberland and York), and 25% of reported cases were from the Midcoast counties (Knox, Lincoln, Sagadahoc, and Waldo).

Forty-three (43%) percent of cases were female and fifty-seven (57%) percent of cases were male. The median age of cases in 2015 was 50 years of age (average age of 45). The age at diagnosis ranged from 1-95 years. Seventy-one (71%) percent of the cases with a known onset date had onset during June, July, or August (date of onset is missing for 23% of cases). Thirty-eight persons (3% of all cases) were reported as hospitalized with Lyme disease. For further Lyme disease statistics in Maine please see Appendix 1.

B. Other Tick-Borne 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 15, 2016 showed 186 cases of anaplasmosis reported in 2015. Cases occurred in Androscoggin, Cumberland, Franklin, Hancock, Kennebec, Knox, Lincoln, Oxford, Piscataquis, Sagadahoc, Waldo, and York counties. For further anaplasmosis disease statistics in Maine please see Appendix 2.

Babesiosis:

Babesiosis is a rare and potentially severe tick-borne disease transmitted through the bite of an infected deer tick (*Ixodes scapularis*). Signs of babesiosis usually range from no symptoms at all (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 15, 2016 showed 55 cases of babesiosis reported in 2015 which is a slight increase from 2014. Cases occurred in Cumberland, Knox, Lincoln, Oxford, Penobscot, Sagadahoc, and York counties. For further babesiosis disease statistics in Maine please see Appendix 2.

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 as the tick appears to be moving north. Preliminary data as of January 15, 2016 showed five cases of *Ehrlichia chaffensis* reported in 2015 from Kennebec, Lincoln, and York counties. Maine had one probable case of Ehrlichia/Anaplasma Undetermined, 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 tick-borne arbovirus occurring in the United States and Canada. Approximately 60 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. No cases were reported in Maine in 2015.

Spotted Fever Rickettsiosis:

Spotted Fever Rickettsioses 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 15, 2016 showed one probable case of RMSF reported in 2015. The case was reported from Penobscot county. For further RMSF disease statistics in Maine please see Appendix 2.

Other Emerging Tick-borne Diseases:

Federal CDC and other researchers are continually on the watch for new or emerging tickborne disease. Several identified in the last few years include *Borrelia miyamotoi*, Heartland virus, and Bourbon virus. Maine has no documented cases of any of these diseases, but has serological evidence (from either humans or wild animals) of both *Borrelia miyamotoi* and Heartland virus making these 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 tick-borne illnesses: http://www.idsociety.org/Index.aspx.

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 http://www.idsociety.org/Index.aspx.

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)" (http://www.idsociety.org/Index.aspx).

"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.'" (http://www.idsociety.org/Index.aspx).

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 tick-borne 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. http://www.idsociety.org/Index.aspx. A bibliography of peer reviewed journal articles published in 2015 as related to these clinical guidelines and other topics of interest is included in Appendix 3. 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 tick-borne illnesses

Maine CDC continues to emphasize prevention and control of Lyme disease. Surveillance for tick-borne diseases, including Lyme disease, is performed by the Division of Infectious Disease, 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 tick-borne 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. 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 2015 Lyme disease surveillance data was performed at the county level, showing the continual disease progression (Appendix 4). 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 tick-borne diseases, offering educational and preventive information as needed. Maine CDC epidemiologists present educational outreach activities and seminars on tick-borne 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 2015, a **clinical management guide**, "Physician's Reference Manual: Tick-borne Diseases in Maine" was mailed to hospital emergency rooms, infectious disease providers, and pediatric practices. This guide includes information on ticks found in Maine and signs/symptoms, laboratory services, diagnosis, and treatment of six tick-borne diseases, including Lyme disease. The cover of this guide is viewable in Appendix 5.

- 342 copies of this guide were distributed in 2015

Maine CDC continues to contribute to **national surveillance and prevention activities**. During 2015, Maine CDC epidemiologists represented the State at both local and national meetings including:

- The Tick-Borne Disease Prevention Meeting held in New Hampshire in May 2015
- Council of State and Territorial Epidemiologist (CSTE) annual conference held in Boston, Massachusetts in June 2015
- Northeast Epidemiology annual conference held in New Brunswick, New Jersey in September 2015

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

Maine CDC promotes ongoing **educational outreach activities** targeting the public and Maine municipalities. During 2015, Maine CDC epidemiologists provided consultation to the public on tick-

borne diseases, offering educational and preventive information as needed. Maine CDC epidemiologists present educational outreach activities and seminars on tick-borne disease prevention to the general public including:

- 20 presentations or displays held for: school nurses, school teachers, students in 3rd-5th grade, forestry students, infectious disease physicians, parks and lands employees, state partners, state staff, pesticide applicators, District Coordinating Council partners, Central Maine Power staff, seniors, and the general public.
- Numerous media interviews given by Maine CDC employees (vector-borne epidemiologist, state health officer, and state epidemiologist).

Maine CDC's Vectorborne Epidemiologist chairs the State **Vector-borne 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 Human Services, Maine Department of Conservation, Maine Department of Agriculture, Conservation, and Forestry, Maine Department of Inland Fisheries and Wildlife, Maine Department of Education, Department of Environmental Protection, 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 Vector-borne 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 pilot project with **students in 3rd to 5th grade to teach them about tick biology and ecology**, as well as present information on tick-borne diseases and prevention. In 2015 Maine CDC implemented the program in four elementary schools in Maine. The program consisted 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 four schools, and Maine CDC is currently working to expand this project statewide. This endeavor is being undertaken in close partnership with the Maine Department of Education. An example of one of the take-home activities can be found in Appendix 7. The school curriculum materials are all accessible online at: http://www.maine.gov/dhhs/mecdc/infectious-disease/epi/school-curriculum/index.shtml

- The curriculum resources website was visited 1,429 times in 2015
- The curriculum webinar video was viewed 69 times as of January 20, 2016

Educational materials for the 5th grade level are available online, including a "Ticks: Know Your Enemy" PowerPoint presentation recorded and narrated by Doug Rafferty. PHC continues to review and update the education materials. Educational materials are available online at: http://www.maine.gov/dhhs/mecdc/infectious-disease/epi/vector-borne/lyme/lyme-resource-educators.shtml.

- The web resource for educators on the subject of Lyme disease was visited 348 times in 2015.

In 2015, Maine CDC and PHC began a pilot to **educate adults ages 65 years and older about ticks and tick prevention practices.** The pilot was implemented in four libraries in Maine and consisted of a questionnaire administered prior to participation to gauge prior knowledge and tick prevention behaviors and to gather contact information, a packet of information in the form of fact sheets on tick-borne diseases in Maine (Lyme disease, *Anaplasma*, and *Babesia*), repellent and other tick prevention methods, tick identification, a tick spoon for tick removal; and a calendar to track prevention behaviors used to measure a change in behavior from before the pilot program to throughout the program. Maine CDC is working to expand the program to more Maine libraries to gain more information on its effectiveness in the 65 years and older age group. See Appendix 8 for a sample of the challenge questionnaire.

Maine CDC and PHC began developing a series of **instructional short videos** to educate the Maine community in tick prevention and tick-borne diseases. These videos include:

- Choosing and Applying Personal Repellents – viewed 84 times as of January 20, 2016
- Tickborne Diseases Webinar – viewed 134 times as of January 20, 2016
- Tick Identification – viewed 3,618 times as of January 20, 2016
- Tickborne Diseases in Maine: Anaplasmosis – viewed 68 times as of January 20, 2016
- How to Choose a Residential Pesticide Applicator – viewed 41 times as of January 20, 2016
- Tickborne Disease in Maine : Babesiosis – viewed 21 times as of January 20, 2016

Maine CDC's Lyme disease website is continually updated to provide information to the public and to health professionals about Lyme disease in Maine. A new web address was created to simplify messaging: www.maine.gov/lyme

- In 2015, the Lyme disease homepage was visited over 10,389 times
- The tick identification page was visited over 10,123 times
- The FAQ section was visited over 40,549 times

Ongoing educational initiatives featured on the Maine CDC website include:

- Lyme disease fact sheets
- Tick Identification
- Distribution of Deer Ticks in Maine
- Prevention of Tick-borne Diseases
- Lyme Disease Surveillance Reports from 2006-2014
- Lyme disease awareness and prevention movie

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

During 2015, **Lyme disease educational materials** were distributed to partners and members of the public. Approximate numbers of materials distributed include:

- ~8,052 Wallet-sized laminated tick identification cards
- ~5,484 Tick remover spoons
- ~2,355 Lyme disease brochures
- ~2,404 Tick ID posters

Members of the Vector-borne 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 tick-borne diseases. Maine CDC also responds to numerous press inquiries and releases press statements as appropriate (www.mainepublichealth.gov). Official releases in 2015 included:

- 2015 Lyme disease information (Health Alert) - released May 1st, 2015.
- Winners of Lyme Disease Awareness Contest (Press Release) – released July 14th, 2015
- Public Health Update – information on tick-borne diseases included from January 8th, 2015 through December 17th, 2015

Pursuant to Legislation enacted in the second regular session of the 126th Legislature, May 2015 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 9)
- 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, and Scarborough
- Presentations throughout the state
- Maine CDC presence at multiple health fairs and conferences

Another major Lyme Disease Awareness month activity was a **statewide poster contest** for students in grades K-8. Students were asked to create a poster with the theme "**Inspect to Protect**" 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 three winning posters are available for viewing at the Lyme disease website www.maine.gov/lyme. Maine CDC used one of the winning posters for our 2015 statewide educational campaign (Appendix 10). 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 2001-2014. Data are broken down by public health district, county, gender, and age group where possible. Data can be viewed as tables, charts, trend charts, or maps. The portal was launched in December 2011, and was accessed 2,345 times during 2015. The Maine Tracking Network Lyme Data are available on Maine CDC's website at www.maine.gov/idepi.

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 tick-borne illnesses based on resources made available by federal Centers for Disease Control and Prevention or Other Organizations

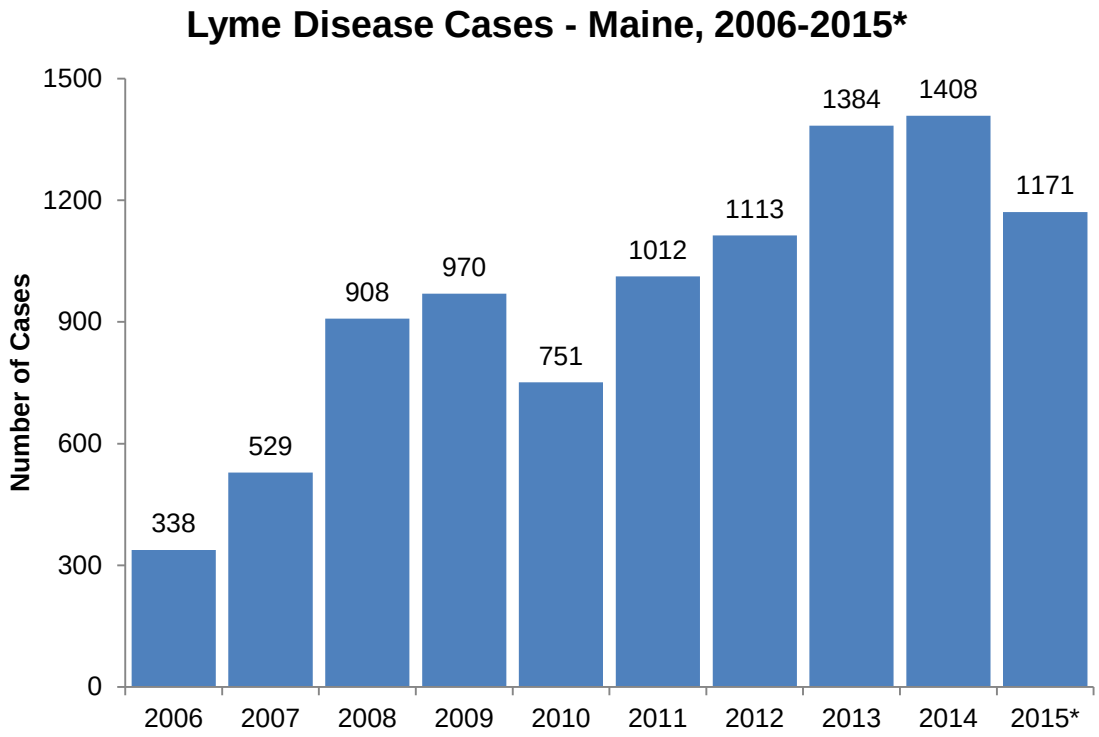
Maine CDC performed a search of state and federal legislation and a state by state listing of legislation relating to Lyme disease can be found in Appendix 11.

Appendix 1
Maine Lyme disease statistics

Number and Rate per 100,000 persons of Lyme Disease Cases by County of Residence – Maine, 2011-2015*

County	2011 Count	2011 Rate	2012 Count	2012 Rate	2013 Count	2013 Rate	2014 Count	2014 Rate	2015 Count	2015 Rate
Androscoggin	58	54.6	80	74.3	72	66.9	94	87.5	45	41.9
Aroostook	3	4.2	1	1.4	3	4.3	5	7.2	2	2.9
Cumberland	276	99.8	267	94.0	351	123.0	339	117.8	252	87.6
Franklin	6	20.2	6	19.6	11	36.1	10	33.0	9	29.7
Hancock	43	80.7	59	108.1	100	182.3	121	221.2	118	215.7
Kennebec	132	109.1	128	105.0	183	151.0	139	114.8	152	125.5
Knox	103	254.0	109	274.8	95	240.2	106	267.2	113	284.8
Lincoln	53	154.2	65	190.2	71	208.3	83	242.9	73	213.6
Oxford	28	50.1	25	43.5	50	87.0	43	75.1	26	45.4
Penobscot	11	7.4	21	13.7	38	24.8	50	32.6	49	31.9
Piscataquis	6	35.6	2	11.6	0	0.0	2	11.7	1	5.9
Sagadahoc	47	130.4	59	167.7	55	157.1	65	185.5	47	134.1
Somerset	9	17.7	11	21.2	32	61.9	17	33.2	27	52.8
Waldo	25	65.2	55	141.7	89	228.6	49	125.5	61	156.2
Washington	13	40.7	7	21.6	13	40.4	14	44.0	18	56.6
York	199	98.7	218	109.5	221	110.8	271	135.0	178	88.7
State	**1012**	**77.1**	**1113**	**83.7**	**1384**	**104.2**	**1408**	**105.9**	**1171**	**88.0**

All data includes both confirmed and probable cases



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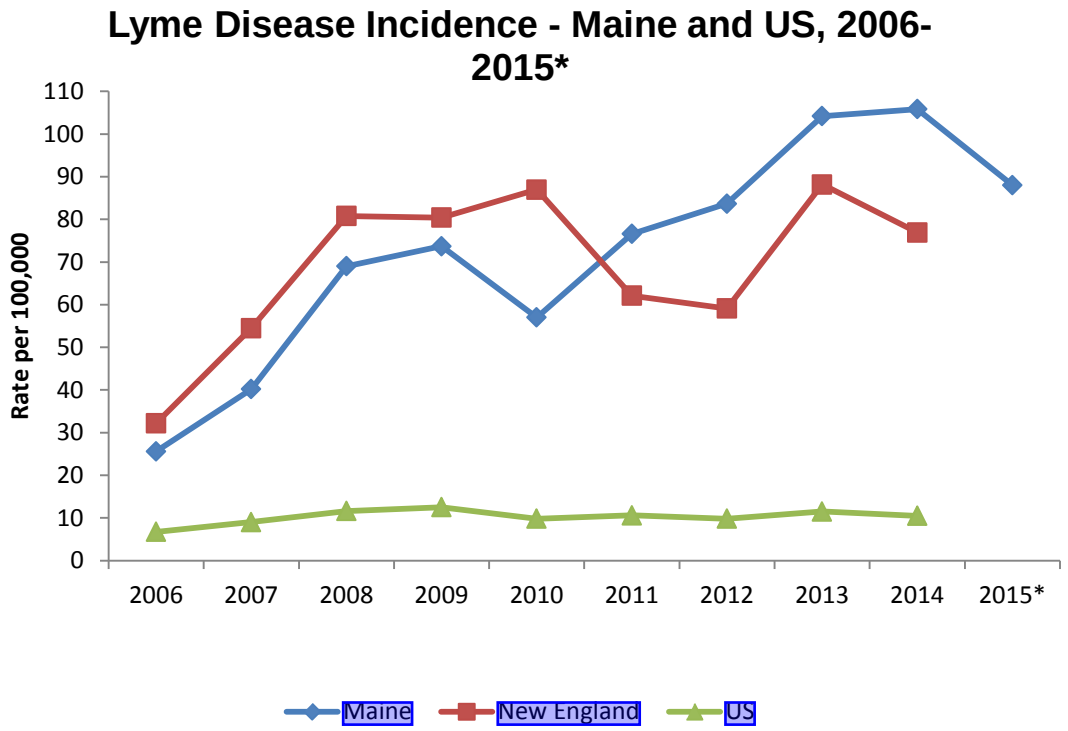
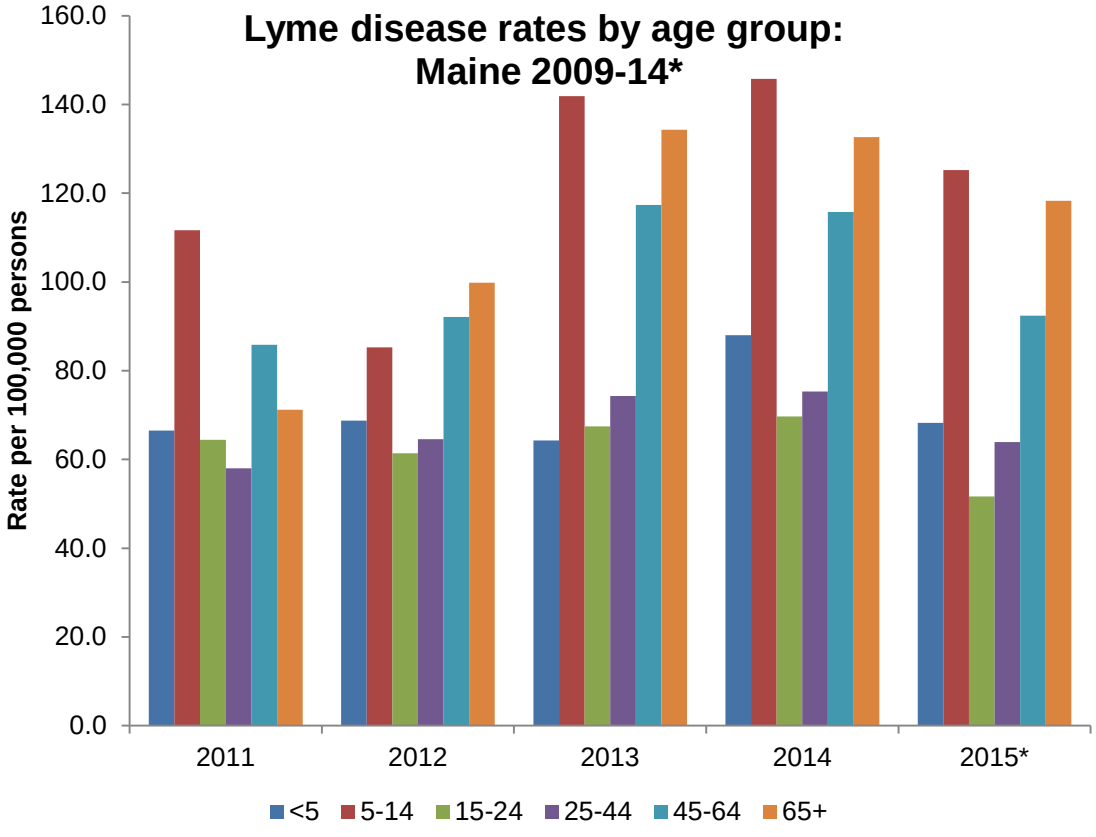
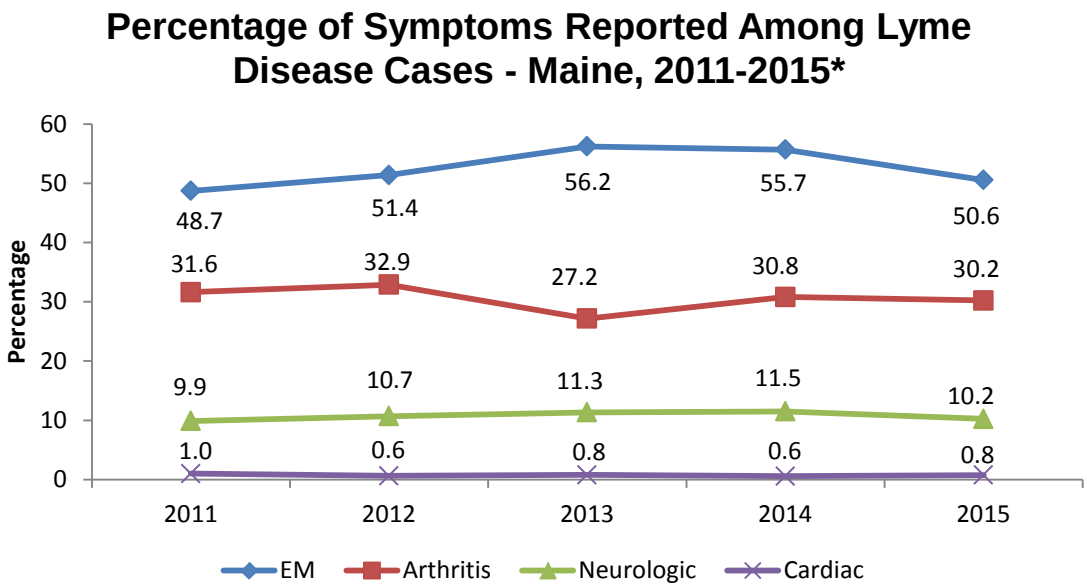


* 2015 data are preliminary as of 01/15/2016



* 2015 data are preliminary as of 01/15/2016



* 2015 data are preliminary as of 01/15/2016

Appendix 2
Maine tick-borne disease statistics

Number of Selected Tick-borne Disease Cases by County of Residence – Maine, 2015*

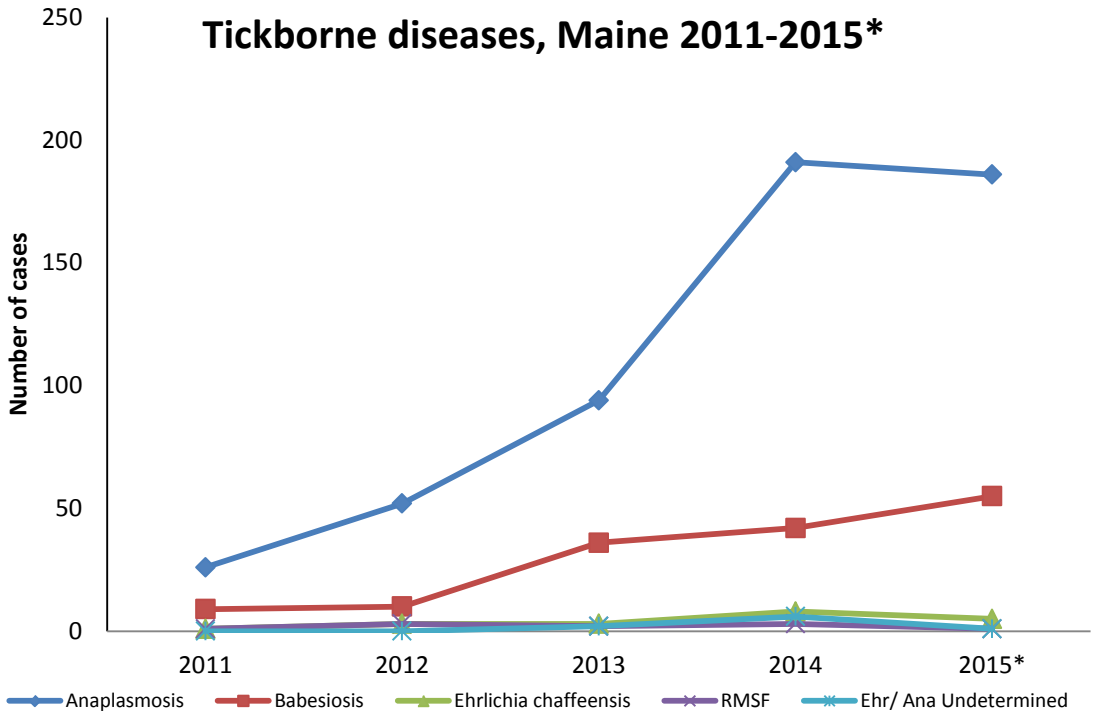
County	Anaplasmosis	Babesiosis	Ehrlichiosis	Ehrlichiosis/ Anaplasmosis Undetermined	RMSF
Androscoggin	9	0	0	0	0
Aroostook	0	0	0	0	0
Cumberland	32	11	0	0	0
Franklin	1	0	0	0	0
Hancock	8	0	0	0	0
Kennebec	10	0	1	0	0
Knox	27	10	0	0	0
Lincoln	33	9	1	1	0
Oxford	2	2	0	0	0
Penobscot	0	1	0	0	1
Piscataquis	1	0	0	0	0
Sagadahoc	20	4	0	0	0
Somerset	0	0	0	0	0
Waldo	7	0	0	0	0
Washington	0	0	0	0	0
York	36	18	3	0	0
Total	**186**	**55**	**5**	**1**	**1**

* 2015 data are preliminary as of 01/15/2016

Number of Selected Tick-borne Disease Cases– Maine, 2006 - 2015*

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015*
Anaplasmosis	10	9	17	15	17	26	52	94	191	186
Babesiosis	9	11	11	3	5	9	10	36	42	55
Ehrlichia chaffeensis	4	3	1	1	4	1	3	3	8	5
Ehr/Ana undetermined	0	0	0	0	0	0	0	2	6	1
RMSF	NR	NR	1	5	2	1	3	2	3	1
Powassan	0	0	0	0	0	0	0	1	0	0

* 2015 data are preliminary as of 01/15/2016



* 2014 data are preliminary as of 01/29/2015

Appendix 3
Peer-reviewed medical literature related to medical management and treatment of Lyme disease – bibliography: 2015

- Barbour AG, Bunikis J, Fish D, Hanincová K. (2015). Association between body size and reservoir competence of mammals bearing Borrelia burgdorferi at an endemic site in the northeastern United States. *Parasit Vectors, 8,* 299. doi: 10.1186/s13071-015-0903-5

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- Miraflor AP, Seidel GD et al. (2015). The many masks of cutaneous Lyme disease. *Journal of Cutaneous Pathology.* doi: 10.1111/cup.12620

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- Ogden NH, Lindsay LR, Schofield SW. (2015). Methods to Prevent Tick Bites and Lyme Disease. *Clinics in Laboratory Medicine 35(4),* 883-899. doi: 10.1016/j.cll.2015.07.003

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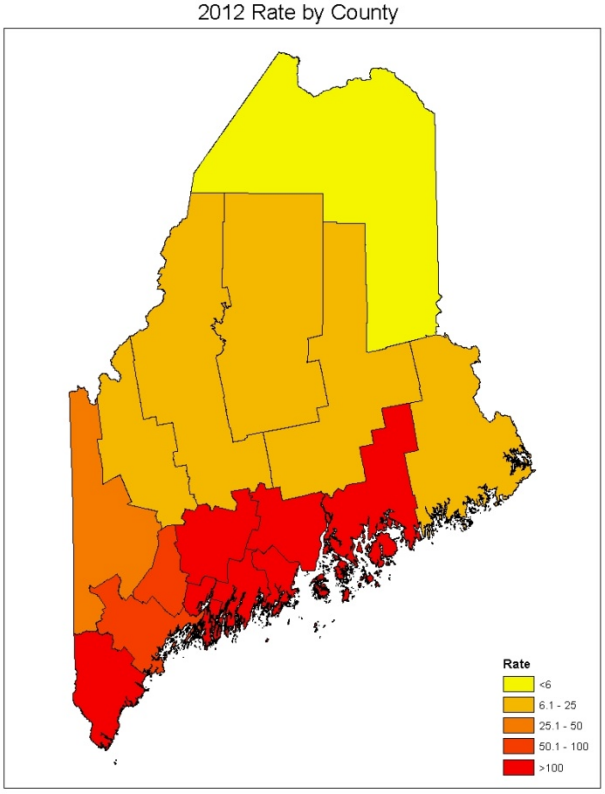
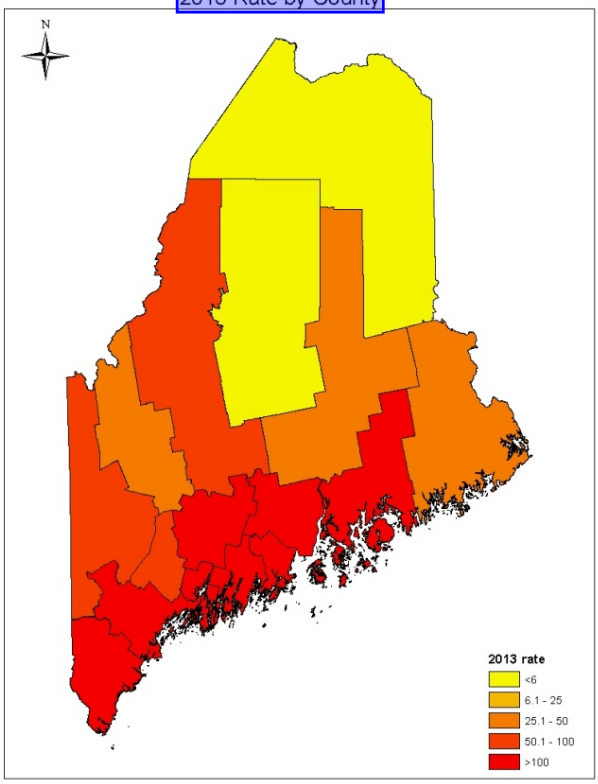
Appendix 4

Lyme Disease Cases per 100,000 people (Rate) – Maine, 2012-2015*

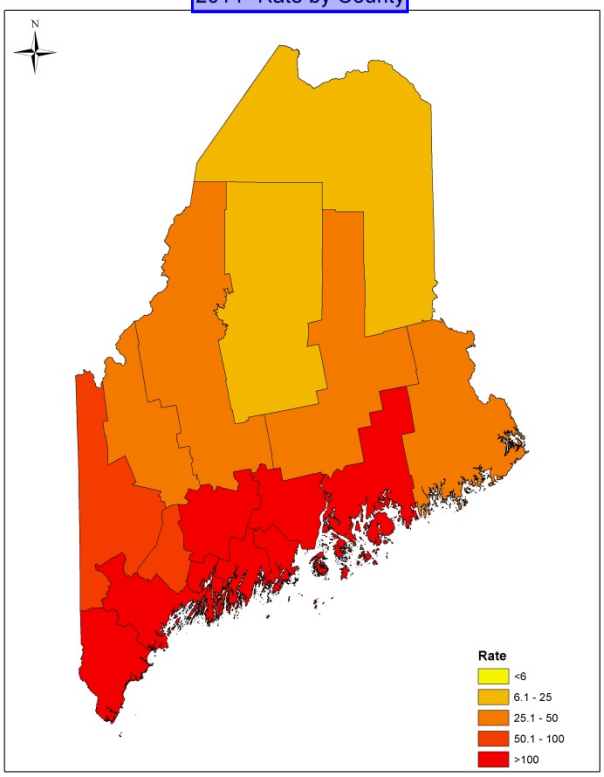
2012 Rate by County



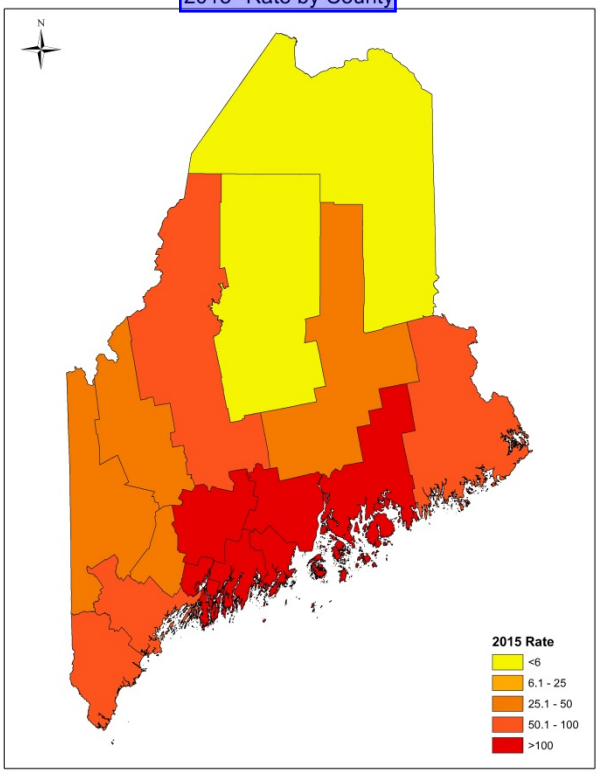
2013 Rate by County



2014* Rate by County



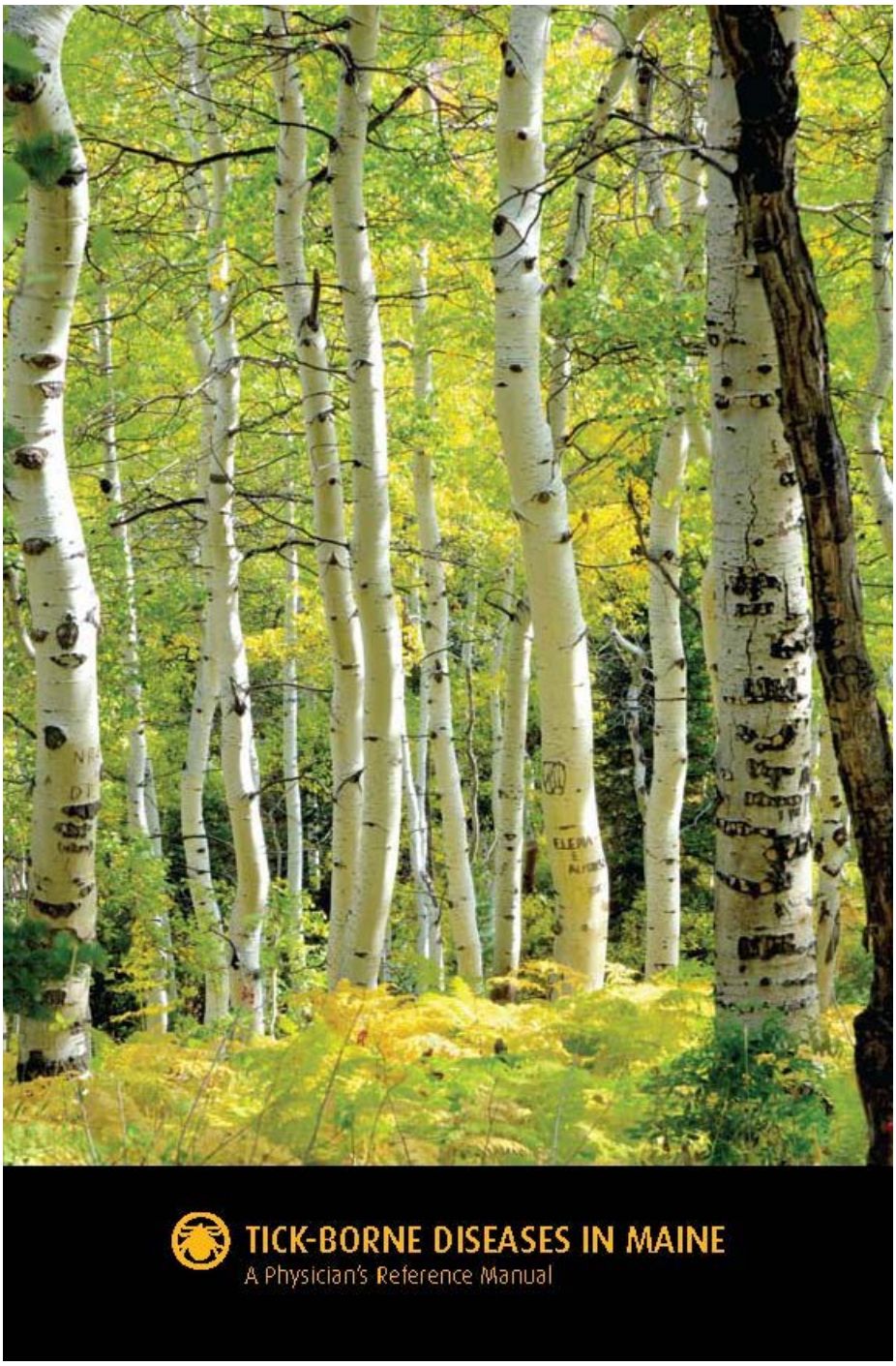
2015* Rate by County



* Preliminary data as of 1/15/2016

Appendix 5

Physician's Reference Guide



Appendix 6

2015 Maine Vector-borne 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
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
Dube, Nancy	Maine Department of Education
Dyer, Robin	US Department of Agriculture
Elias, Susan	Maine Medical Center Research Institute, University of Maine Orono
Fish, Gary	Maine Board of Pesticides Control
Foss, Kimberly	Municipal Pest Management
Groden, Ellie	University of Maine Orono
Hicks, Lebelle	Maine Board of Pesticides Control
Hinkel, Bill	Maine Department of Environmental Protection
Jackson, 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
Kirby, Clay	University of Maine Cooperative Extension
Lacombe, Eleanor	Maine Medical Center Research Institute
Lichtenwalner, Anne	University of Maine, Animal Health Laboratory
Lubelczyk, Charles	Maine Medical Center Research Institute
McEvoy, Elizabeth O.	Maine Department of Agriculture, Conservation, and Forestry
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
Rand, Peter	Maine Medical Center Research Institute
Ravana, Kyle	Maine Department of Inland Fisheries and Wildlife
Robinson, Sara	Maine CDC
Smith, Rob	Maine Medical Center Research Institute
Storch, Dick	University of Maine Cooperative Extension
Struble, Dave	Maine Forest Service
Szantyr, Beatrice	Physician, Lincoln Maine
Walsh, Michele	Maine Department of Agriculture, Conservation, and Forestry
Webber, Lori	Maine CDC
Welch, Margaret	Maine Medical Center Research Institute
Wood, Greg	Maine Department of Environmental Protection

Appendix 7
Sample 5th Grade Activity

Tick Word Search

Can you find the tick related words hidden in the puzzle?

E	G	H	L	O	N	O	P	G	H	B	R	C	G	L
R	S	T	Y	H	B	S	S	A	R	G	D	L	H	T
J	P	R	S	A	C	L	K	H	T	U	S	L	W	H
Z	E	A	U	Q	E	R	I	B	I	L	D	E	R	A
N	R	P	M	N	L	N	N	X	O	W	E	A	G	S
L	N	E	M	A	E	P	O	T	H	Z	E	W	R	K
F	N	U	E	E	P	R	P	O	E	V	R	E	A	C
M	P	A	R	E	N	T	I	R	I	T	T	P	L	O
S	K	C	I	Z	W	I	S	Z	L	C	I	T	V	S
T	I	G	O	E	N	Y	U	S	K	H	C	B	L	D
N	E	L	Y	M	E	N	M	P	U	A	K	O	H	C
I	A	N	P	P	W	R	G	R	V	N	E	R	A	P
O	D	B	D	L	S	T	N	A	P	U	L	W	N	U
J	O	L	L	V	C	P	A	Y	U	R	R	E	A	L
T	L	K	C	E	H	C	Y	O	L	L	T	M	Y	L

Circle the words you find in each category:

Transmission
DEER TICK
SUMMER
JOINTS
LYME
GRASS

Symptoms
RASH
WEAK
BITE
SKIN

Prevention
SOCKS
PANTS
SPRAY
CHECK

Removal
PARENT
NURSE
TWEEZERS
PULL

Appendix 8

By completing this questionnaire you are eligible to participate in Tick-Free ME. Return this questionnaire to your librarian to receive the challenge materials.

Name: **Age:**

Email Address:

Please check one box for each question:

1. Over the last 4 weeks, how often did you participate in outdoor activities that put you at risk for tick bites (i.e. activities in wooded areas or with high grass, brush, leaves present)?

☐ Daily ☐ <1 time/week ☐ 1-2 times/week ☐ 3-6 times/week ☐ Never

2. Over the last 4 weeks, how often did you wear EPA approved repellent (i.e. DEET, Picaridin, IR3535, Oil of Lemon Eucalyptus, or Permethrin) for outdoor activities?

☐ Daily ☐ <1 time/week ☐ 1-2 times/week ☐ 3-6 times/week ☐ Never

3. Over the last 4 weeks, how often did you wear protective clothing (i.e. light-colored clothing, long sleeves, long pants, pants tucked into long socks) while you were at risk for tick bites?

☐ Daily ☐ <1 time/week ☐ 1-2 times/week ☐ 3-6 times/week ☐ Never

4. Over the last 4 weeks, how often did you do a tick check on yourself?

☐ Daily ☐ <1 time/week ☐ 1-2 times/week ☐ 3-6 times/week ☐ Never

5. Over the last 4 weeks, how often did you perform maintenance around your home, such as keeping your lawn mowed, raking your lawn, or bordering your lawn with mulch, to lower risk of ticks?

☐ Daily ☐ <1 time/week ☐ 1-2 times/week ☐ 3-6 times/week ☐ Never

6. What is your level of knowledge about prevention of tick bites?

☐ Low ☐ Medium ☐ High ☐ Expert

7. What is your level of knowledge about tickborne diseases?

☐ Low ☐ Medium ☐ High ☐ Expert

☐ I consent to receive reminder prompts and feedback inquisitions in the form of emails at the address I've provided. Otherwise your name and contact information will be used solely for the purpose of distributing prizes if applicable.

Appendix 9

2015 Governor's Proclamation

State of Maine

Proclamation

WHEREAS, the Maine Center for Disease Control and Prevention reports that in 2014, more than 1,395 cases of Lyme disease have been reported; and

WHEREAS, the actual incidence of Lyme disease is likely far more than reported; and

WHEREAS, Lyme disease disproportionately affects children between five and fifteen years and mature adults over sixty-five years; and

WHEREAS, public awareness and education are necessary to educate and promote awareness of Lyme disease and other tick-borne illnesses; 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, 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 sixteenth day of April Two Thousand Fifteen

Paul R. LePage
Governor

Matthew Dunlap
Secretary of State
TRUE ATTESTED COPY

Appendix 10

Maine CDC Lyme Disease Awareness Month Poster 2015

Appendix 11

2015 Tick-borne Disease Legislation

Alabama

Title: Lyme Disease, physicians authorized to prescribe long-term antibiotic therapy, discipline by the Medical Examiners Board precluded under certain conditions, insurance coverage (HB 468)
Status: Failed

Title: Tick borne disease, physicians authorized to prescribe long-term antibiotic therapy under certain conditions (HB 606)
Status: Failed

Title: Tick borne illnesses, Alabama Study Commission on Tick Borne Illnesses, created (HJR 314)
Status: Failed

Title: Study Commission on Tick Borne Illnesses (HR 370)
Status: Passed

Title: Lyme disease, Center for Disease Control, urged to improve prevention, diagnosis, and treatment (HJR 61)
Status: Passed

Arkansas

Title: To create the task force on tick-borne disease (HB 1658; Act 1247)
Status: Passed

Connecticut

Title: An Act Establishing a Task Force to Study Tick-borne Illnesses (HB 05445)
Status: Failed

Title: An Act Concerning Funding for a Lyme disease Prevention and Education Program (SB 00207)
Status: Failed

Delaware

Title: Recognizing May As “Lyme Disease Awareness Month” In the State of Delaware (HCR 24)
Status: Passed

Federal

Title: To accelerate the discovery, development, and delivery of 21st century cures, and for other purposes (HR 6)
Status: Failed

Title: To provide for enhanced Federal efforts concerning the prevention, education, treatment, and research activities related to Lyme disease and other tick-borne diseases, including the establishment of a Tick-Borne Diseases Advisory Committee (S 1503)
Status: Failed

Title: To provide for research with respect to Lyme disease and other tick-borne diseases and for other purposes (HR 789)
Status: Failed

Title: To provide for the establishment of the Tick-Borne Diseases Advisory Committee (HR 665)
Status: Failed

Kansas

Title: Recognizing Tick-borne Disease Awareness Month and Supporting Further Lyme disease Research (SR 1751)
Status: Passed

Maine

Title: An Act to Improve Access to Treatments for Lyme disease (HP 289; LD 422)
Status: Passed; Law without Governor's signature

Massachusetts

Title: An Act Relative to Control of Tick-borne Illness (H 651)
Status: Failed

Michigan

Title: A Resolution to Declare May 2015 as Lyme disease Awareness Month in the State of Michigan (HR 72)
Status: Passed

New Hampshire

Title: An Act Relative to Lyme disease Awareness (HB 363)
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; provides for taxpayer gifts for tick borne illness research, detection and education; establishes the tick borne illness research, detection and education fund. (A 01277)
Status: Failed

Title: Relates to the establishment, extension, powers and expenses of tick control districts (S 04439)
Status: Failed

Title: Relates to instructional tools and materials for school districts and libraries to assist in the education and awareness program to protect children from Lyme disease and tick-borne infections (S 05804)
Status: Failed

Title: Requires health insurers to provide coverage for long term medical care for Lyme disease and other tick borne related pathogens (S 00653)
Status: Failed

Title: Relates to including a Lyme disease and tick-borne infection awareness and prevention program within health care and wellness education and outreach programs (S 05803)
Status: Passed

Ohio

Title: To urge the Centers for Disease Control and Prevention to take action to improve prevention, diagnosis, and treatment of Lyme disease (HCR 5)
Status: Passed

Pennsylvania

Title: Designating the month of May 2015 as "Lyme Disease Awareness Month" in Pennsylvania (S 82)
Status: Passed

Rhode Island

Title: Proclaiming the Month of May, 2015, To Be “Tick Borne Disease Month” In the State Of Rhode Island (S 0900)
Status: Passed

Title: Respectfully Requesting the Rhode Island Department of Health to Report on Lyme disease (S 1030)
Status: Passed