



*Maine Center for Disease  
Control and Prevention*

*An Office of the  
Department of Health and Human Services*

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## Report to Maine Legislature

### Lyme Disease

February 5, 2010

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## **Executive Summary**

During the first special session of the 123<sup>rd</sup> 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.

Chapter 561 of the Sessions Laws of the 123<sup>rd</sup> Maine Legislature, now incorporated into a statute governing Maine Center for Disease Control and Prevention, directs Maine CDC to report on:

- I. The incidence of Lyme disease and other tick-borne illness in Maine
- II. The treatment guidelines for Lyme disease recommended by Maine Center for Disease Control and Prevention and federal Centers for Disease Control and Prevention
- III. A summary or bibliography of peer-reviewed medical literature and studies related to the 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
- 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 federal Centers for Disease Control and Prevention or other organizations.

This is the second annual report to the Legislature and includes an update on activities conducted during 2009.

## Tick Borne Disease Summary for 2009 (Preliminary data as of January 19, 2010)

- Lyme disease incidence in Maine continued to increase during 2009. A total of 929 confirmed and probable cases were reported among Maine residents last year (Preliminary data as of January 19, 2010).
- Over half of cases occurred among residents of York (28%) and Cumberland (28%) counties.
- Cases were reported among residents of each of Maine's 16 counties.
- 2009 count of Lyme disease case by DHHS District:

|                 |              |
|-----------------|--------------|
| York: 257       | Central: 99  |
| Cumberland: 264 | Downeast: 35 |
| Midcoast: 179   | Penquis: 10  |
| Western: 79     | Aroostook: 6 |
- Symptoms of reported cases of Lyme disease in Maine included: 43% (400 persons) had the characteristic expanding rash (Erythema Migrans); 29% (265 persons) had joint swelling, and 13% (120 persons) had Bells Palsy or other cranial neuritis. Cases could report more than one symptom.
- 46 persons (5%) were hospitalized.
- Among case patients with a reported date of symptom onset, 52% began seeing symptoms during June, July, or August. Date of symptom onset is missing for 26% of cases.
- 54% of cases are male.
- Lyme disease cases were reported among persons of all ages in 2009, but as has been the case historically in Maine and nationally, age groups with the highest numbers of cases are school-age children (5-14) and middle age adults (45-64).
- Cases of other diseases carried by ticks were also reported during 2009: Babesiosis (3), Anaplasmosis (15), Ehrlichiosis (1), and Rocky Mountain Spotted Fever (5).

## Key Prevention Messages

- Avoidance of tick habitat is recommended, when possible, especially when ticks are prevalent. Potential tick habitat includes deciduous forest, overgrown fields, shrub layer, leaf litter, brushy and grassy places, and the edge areas between lawns and woods. Walking in the center of trails to avoid contact with overgrown grass, brush and leaf litter at trail edges can minimize risk of tick exposure.

- Use of repellents containing 20%-30% DEET on uncovered skin and clothing for older children and adults (10% DEET for kids > 2 months). Wearing long sleeves and long pants and tucking pant legs into socks may also keep ticks from attaching.
- “Tick-safe” landscaping can reduce the risk of getting tick bites in areas where people are working or engaging in recreation. Remove leaf litter, tall grass, and brush. Creating borders between woods and lawn, careful use of pesticides applied by a licensed applicator, and discouraging deer with physical barriers may all be useful.
- Checking for ticks after being outside in tick habitat is important. Removing ticks with tweezers during the first 24 hours of attachment will prevent most cases of Lyme disease.
- Ticks found on people and pets can be submitted to Maine Medical Center Research Institute (<http://www.mmcri.org/lyme/lymehome.html>) for identification.

### Lyme Disease Information

- Most cases of Lyme disease are acquired in the summer months. In Maine, the incidence begins to increase in May and peaks in July.
- Many persons with Lyme disease develop an expanding red rash at the site of a tick bite 3-30 days after the bite, though many people did not recognize the tick when it was attached. The rash usually persists and enlarges over several days (it does not have to look like a bull's eye!). If one has an unexplained rash, or if one sustains an illness with fever after having been in tick habitat a health care provider should be consulted and informed of the potential exposure to ticks. Early treatment of Lyme disease prevents most complications
- The great majority of Lyme disease cases can be treated very effectively with oral antibiotics for 10 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.

## I. The Incidence of Lyme disease and other tick borne illness in Maine

### **Lyme disease**

Lyme disease is caused by a bacterium, *Borrelia burgdorferi* that 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.

In the United States, 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.

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. During the 1990's the great majority of Lyme disease cases were residents of south coastal Maine, principally in York County. In recent years, however, disease incidence has increased steadily in the Midcoast, and in the Kennebec and Androscoggin river valleys.

In 2009 (preliminary data as of January 19, 2010) 929 confirmed and probable cases of Lyme disease were reported among Maine residents. This is an incidence rate of 70.6 cases of Lyme disease per 100,000 persons in Maine. Over half of the cases were reported among residents from York County (28%) and Cumberland County (28%).

Fifty four percent of cases were male and 46% were female. The median age of cases in 2009 was 45 years of age (average age of 40), which is consistent with the median age for the previous 4 years. The age range was from 1-94 years of age. Just over half (52%) of cases had onset during June, July, or August (date of onset is missing for 26% of cases). Forty six persons (5% of all cases) were reported to have been hospitalized with Lyme disease. For further Lyme disease statistics in Maine please see Appendix 1.

### **Other Tick Borne Diseases in Maine**

In 2009, four other tick borne diseases were reported in Maine. Preliminary data as of January 19, 2010 showed 11 confirmed and 4 probable cases of anaplasmosis, 2 confirmed and 1 probable cases of babesiosis, 1 probable case of ehrlichiosis, and 5 probable cases of Rocky Mountain Spotted Fever. Cases were reported from York, Cumberland, Androscoggin, Lincoln, Knox, Hancock, Somerset, and Penobscot counties.

## II. Treatment Guidelines for Lyme disease recommended by Maine Center for Disease Control and Prevention and federal Centers for Disease Control and Prevention

Within Maine Center for Disease Control and Prevention, we continue to adhere to the strongest science based source of information for the diagnosis and treatment for any infectious disease of public health significance. At the national level, the Infectious Disease Society of America (IDSA) continues to provide leadership in setting the standard for clinical practice guidelines on Lyme disease and other tick borne illnesses: <http://www.idsociety.org/content.aspx?id=4432#ld> We continue to refer the medical community to this document.

Further, the Public Health Infectious Disease work group, comprised of infectious disease physicians from throughout the State, meets bi-monthly to discuss emerging infectious disease issues of potential public health significance. Vectorborne diseases including Lyme disease and other tick borne illnesses have been in focus at many of these meetings. Discussions include an update on the surveillance, diagnostics and treatment for these disease entities.

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

At the national level, 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/content.aspx?id=4432#ld>. A bibliography of peer reviewed journal articles published in 2009 as related to these clinical guidelines is included in Appendix 2. Maine CDC plans a more thorough review of these journal articles to maintain an understanding of the current research and literature available on Lyme disease clinical management and treatment.

During 2009, IDSA convened a special review of the clinical practice guidelines on Lyme disease to conduct a comprehensive and up to date evaluation of the scientific literature 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 panel heard from authors of IDSA's guidelines, who concluded there is no convincing biologic evidence for symptomatic, chronic *Borrelia burgdorferi* infection after completion of the recommended treatment for Lyme disease, which, according to IDSA's guidelines, is 10-28 days, depending on the stage of illness. 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 special review panel also reviewed the medical and scientific literature as well as material submitted by the 18 individuals who testified at the July 30 hearing and about 150 other comments submitted by the public. The panel's final report will recommend one of the following options: no change in the 2006 guidelines, sectional revision, or a complete rewrite. If the panel recommends a change or rewrite, then IDSA will convene a separate panel to carry out that task. The panel is expected to issue its final report shortly after the first of the year (2010).

At the time of this report, a final report from the review panel is not yet available.



#### IV. 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 conducted surveillance evaluation studies during 2008 to assess changes in Lyme disease case definitions. Maine CDC continues to partner with Maine Medical Center Research Institute to monitor the identification of deer ticks in Maine. A map of deer ticks by town of submitter is included in Appendix 3.

During 2010, additional surveillance activities are planned, including spatial analysis of Lyme disease surveillance data, and outreach and education to clinicians and other healthcare providers to increase provider response to required supplemental clinical and laboratory information.

Maine CDC epidemiologists provided 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 meeting of school nurses and others. Ongoing educational initiatives are featured on the Maine CDC web site: <http://www.maine.gov/dhhs/boh/ddc/epi/vector-borne/lyme/>

During 2010, additional clinical outreach and educational efforts are planned, including a clinical management guide, "Physician's Reference Manual: Tick-borne Diseases in Maine, December 2009" to be distributed to licensed physicians in Maine through a direct mailing. This guide includes information on ticks found in Maine and signs/symptoms, laboratory services, and treatment of six tick borne diseases, including Lyme disease. A copy of this guide is included in Appendix 4.

Maine CDC continues to contribute to national surveillance and prevention activities. During 2009, Maine CDC epidemiologists represented the State at two national meetings: the US Environmental Protection Agency's "Regional Science Workshop Biodiversity and Landscape Change and Lyme Disease: Science and Application" meeting in Massachusetts, and the CDC's Division of Vector-borne Infectious Diseases (DVBID) and Division of Healthcare Quality Promotion (DHQP) :Invitational Public Health Meeting on Surveillance, Control and Prevention of Tickborne Diseases" meeting in Ft Collins, Colorado. Maine CDC epidemiologists also contributed to peer-reviewed presentations and manuscripts related to tick-borne diseases during 2009: the American Society of Tropical Medicine and Hygiene, 57th Annual Meeting, New Orleans, LA. Poster Presentation: Implications of a Change in the Case Definition of Lyme disease Surveillance - Maine, 2007 and Centers for Disease Control and Prevention. Anaplasmosis and Ehrlichiosis – Maine, 2008. Morbidity and Mortality Weekly Report, September 25, 2009.



## V. 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. 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 tickborne disease prevention to the general public including presentations or displays held for, Department of Transportation employees, logging industry and other private business, sportsman shows and other events throughout the year.

A Maine CDC epidemiologist chairs the State Vector Borne 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, Maine Department of Inland Fisheries and Wildlife, Maine Department of Education and Cultural Services, Maine Veterinary Association, Maine Municipal Association, University of Maine Cooperative Extension Services, United State Department of Agriculture, and Maine Department of Public Safety.

The Vectorborne Work Group educational sub-committee has developed educational materials for fifth graders on Lyme disease prevention. Developed materials have been posted to the website for use by all schools. A finalized "Ticks: Know Your Enemy" PowerPoint presentation was recorded, narrated by Doug Rafferty and is also available online. Although use of this information is not monitored, the educational portion of the Lyme disease website has been visited over 160 times since the website was launched in May. The teacher's version of the "Ticks: Know Your Enemy" PowerPoint has been visited over 200 times in this same time period. The education subcommittee continues to develop the materials, and is working to meet the Maine curriculum requirements by developing 3-4 units of structured curriculum. This fifth grade curriculum will include education on dressing properly, ecology, prevention, and outdoor tick habitats. This endeavor is being undertaken in close partnership with the Maine Department of Education. The educational materials are available online at <http://www.maine.gov/dhhs/boh/ddc/epi/vector-borne/lyme/lyme-resource-educators.shtml>

Maine CDC promoted Lyme disease awareness in partnership with the Maine Youth Camping Association during 2009. Lyme disease brochures and tick cards were distributed to Maine youth camps to promote Lyme disease prevention and tick awareness with summer campers.

A forum on Community Prevention and Tickborne Disease, targeting municipalities was held on May 7, 2009 in York. Approximately 25 persons attended, including town managers and staff, researchers, and concerned citizens. Attendees heard presentations on epidemiology, tick biology and ecology, personal protection, landscape management, deer herd management, tick and mosquito management and safe pesticides use. Presentations were given by experts from Maine Medical Center Research Institute, tick and mosquito management contracting companies, Maine CDC, Maine Department of Inland Fisheries and Wildlife, and the Maine Department of Agriculture. These forums have been convened annually by the Vectorborne Work Group to target the informational and prevention needs for town officials in southern and coastal Maine. A copy of the meeting agenda for the May 2009 community forum is included in Appendix 5.

The Maine CDC Lyme disease website is continually updated to provide information to the public and to health professionals about Lyme disease in Maine. Ongoing educational initiatives featured on the Maine CDC web site (<http://www.maine.gov/dhhs/boh/ddc/epi/vector-borne/lyme/index.shtml>) include: Lyme disease fact sheet and Q&As; Tick Identification; Distribution of Deer Ticks in Maine; Proper Use of Insect Repellents (Q & A); Prevention of Tick-borne Diseases; Lyme Disease

Surveillance Reports from 2006-2008 and Lyme disease awareness and prevention movie. Links are also provided for the educational materials for educators and the 5<sup>th</sup> grade curriculum, and for other tickborne diseases including: powassan, babesiosis, anaplasmosis, and ehrlichiosis.

During 2009, Lyme disease educational materials were distributed to partners and members of the public. Total requests for the following materials were : 4359 wallet sized laminated tick cards; 1714 Lyme disease brochures; 226 Lyme disease fact sheets; and 100 Lyme disease DVDs. Members of the Vector-borne Disease Working Group assist Maine CDC distributing educational materials as widely as possible throughout the State.

In partnership with Maine Medical Center Research Institute, Maine CDC provides Lyme disease education and prevention materials to members of the public that submit ticks to the Research Institute for identification. Copies of these materials are included in Appendix 6.

The Maine CDC releases Health Alerts on disease concerns of public health significance, including tick borne diseases. The Maine CDC also responds to numerous press inquiries and releases press statements as appropriate (<http://www.maine.gov/dhhs/boh/newhan.shtml>).

During 2009, Maine CDC developed a Lyme disease education tool for the public, "Tick Removal Kits." This pocket-sized kit provides tools and brief educational messages around tick identification, tick removal, and Lyme disease prevention. Distribution to youth groups, including schools and camps, sportsmen groups, and other groups that frequent the outdoors during the summer and fall is planned during 2010. A copy of the cover of the Tick Kit is included in Appendix 7.

Our 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 DEET-containing tick 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 habitat 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. 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 8.

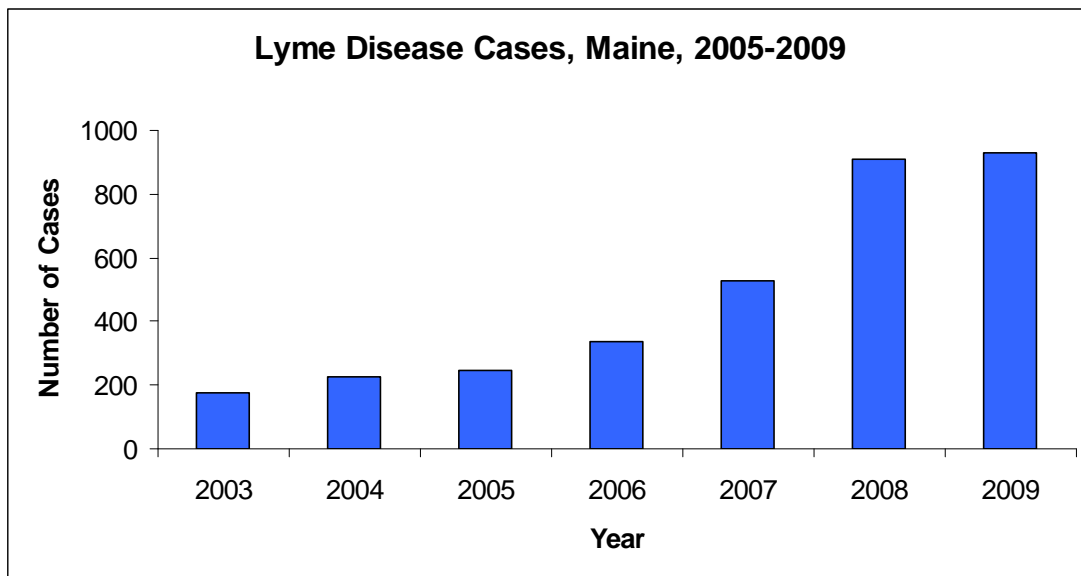
## Appendix 1

### Lyme Disease Statistics in Maine

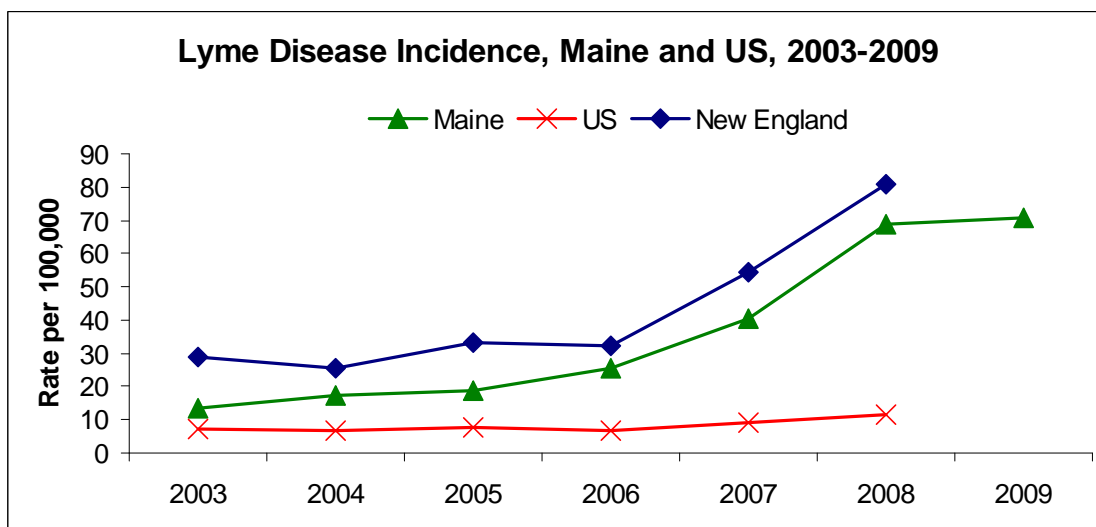
Table 1: Number and Incidence Rate per 100,000 persons of Lyme Disease Cases by County of Residence, Maine, 2006-2009\*.

| County       | 2006  |      | 2007  |      | 2008  |       | 2009*  |       |
|--------------|-------|------|-------|------|-------|-------|--------|-------|
|              | Count | Rate | Count | Rate | Count | Rate  | Count* | Rate  |
| Androscoggin | 10    | 9.3  | 21    | 19.7 | 36    | 33.7  | 54     | 50.5  |
| Aroostook    | 0     | 0.0  | 2     | 2.8  | 4     | 5.6   | 6      | 8.4   |
| Cumberland   | 96    | 35.0 | 165   | 59.9 | 228   | 82.6  | 264    | 95.6  |
| Franklin     | 5     | 16.7 | 1     | 3.3  | 4     | 13.4  | 11     | 36.8  |
| Hancock      | 6     | 11.2 | 14    | 26.3 | 13    | 24.5  | 31     | 58.3  |
| Kennebec     | 22    | 18.2 | 46    | 38.1 | 114   | 94.2  | 93     | 76.9  |
| Knox         | 17    | 41.4 | 21    | 51.5 | 72    | 177.0 | 69     | 169.6 |
| Lincoln      | 19    | 53.9 | 26    | 74.7 | 40    | 115.5 | 43     | 124.2 |
| Oxford       | 1     | 1.8  | 6     | 10.6 | 21    | 37.0  | 14     | 24.7  |
| Penobscot    | 5     | 3.4  | 7     | 4.7  | 13    | 8.7   | 8      | 5.4   |
| Piscataquis  | 0     | 0.0  | 0     | 0    | 1     | 5.9   | 2      | 11.8  |
| Sagadahoc    | 13    | 35.3 | 33    | 90.7 | 40    | 110.1 | 50     | 137.6 |
| Somerset     | 3     | 5.7  | 3     | 5.8  | 9     | 17.5  | 6      | 11.7  |
| Waldo        | 8     | 20.7 | 12    | 31.2 | 19    | 49.6  | 17     | 44.3  |
| Washington   | 0     | 0.0  | 0     | 0    | 3     | 9.2   | 4      | 12.3  |
| York         | 133   | 65.8 | 172   | 85.4 | 291   | 144.3 | 257    | 127.4 |
| Maine        | 338   | 25.6 | 529   | 40.2 | 908   | 69.0  | 929    | 70.6  |

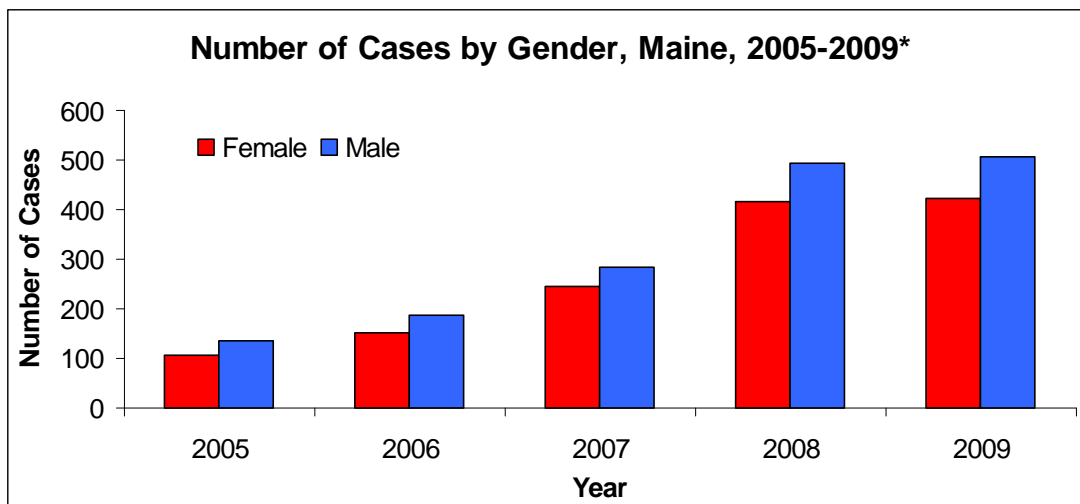
\*2009 data is preliminary as of 1/19/10, all data includes both confirmed and probable cases.



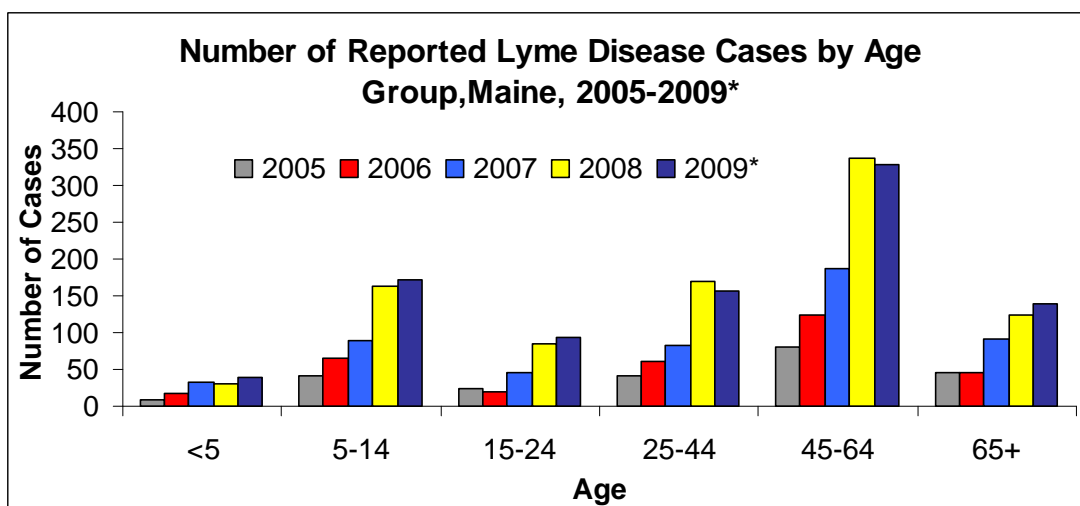
\*All 2009 data are preliminary as of 1/19/10, all data includes both confirmed and probable cases.



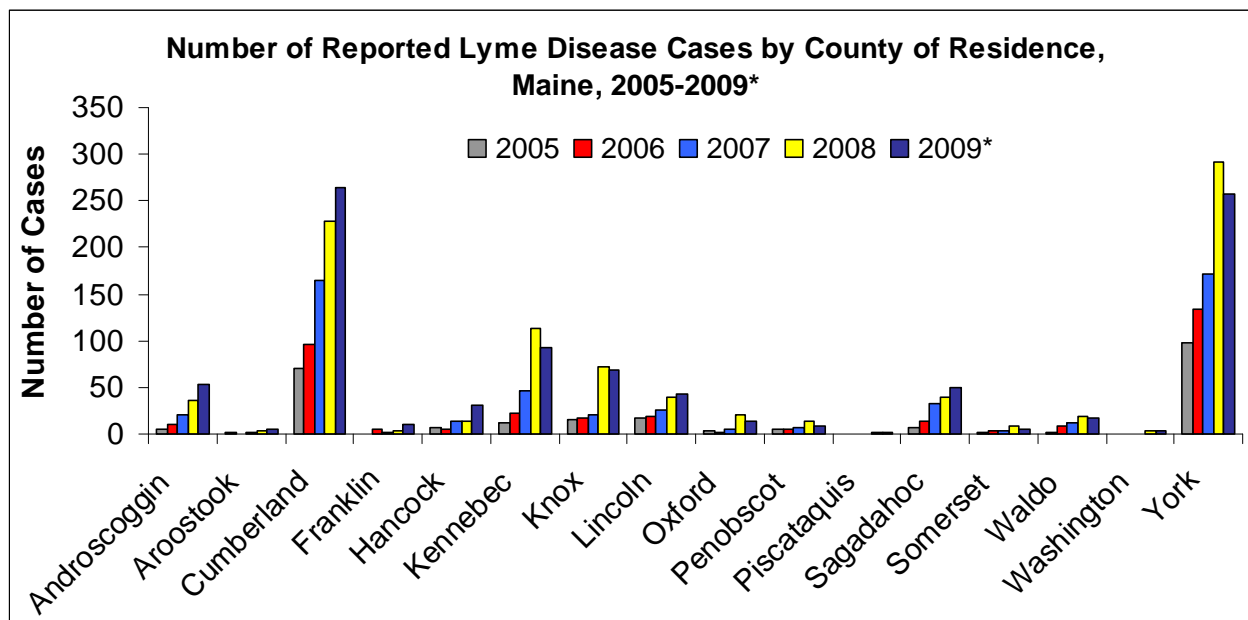
\*All 2009 data are preliminary as of 1/19/10, all data includes both confirmed and probable cases.



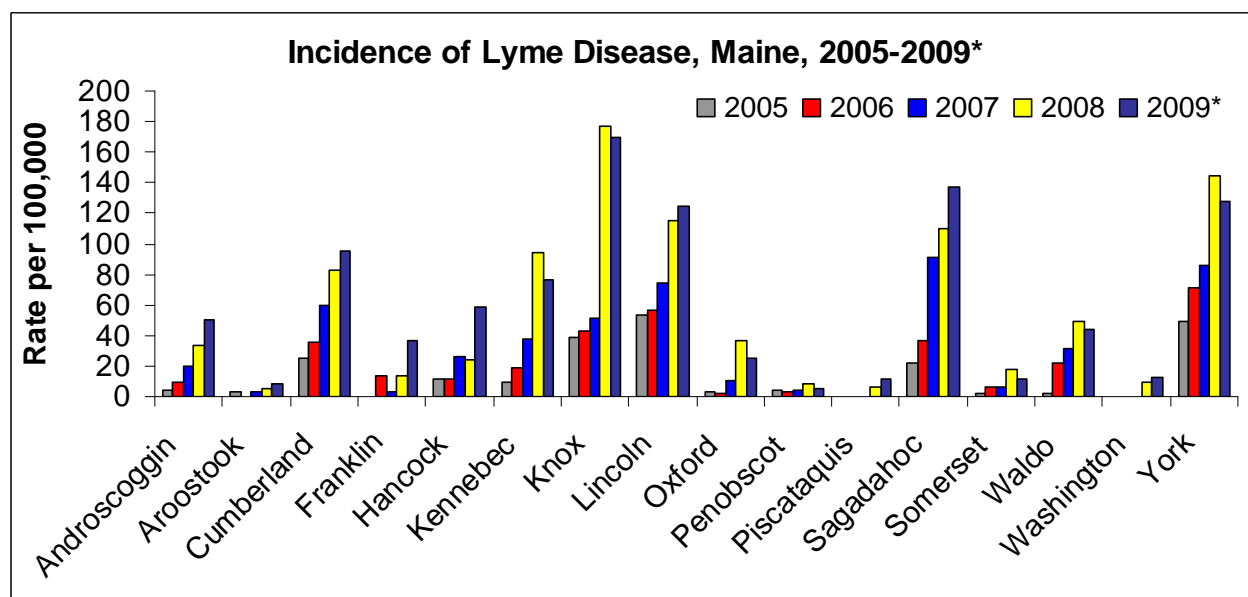
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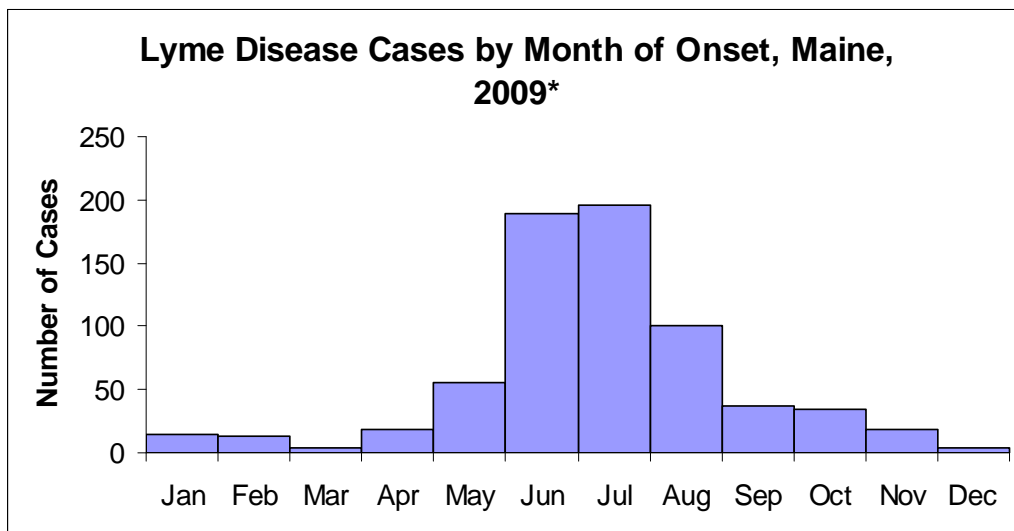


\*All 2009 data are preliminary as of 1/19/10, all data includes both confirmed and probable cases.

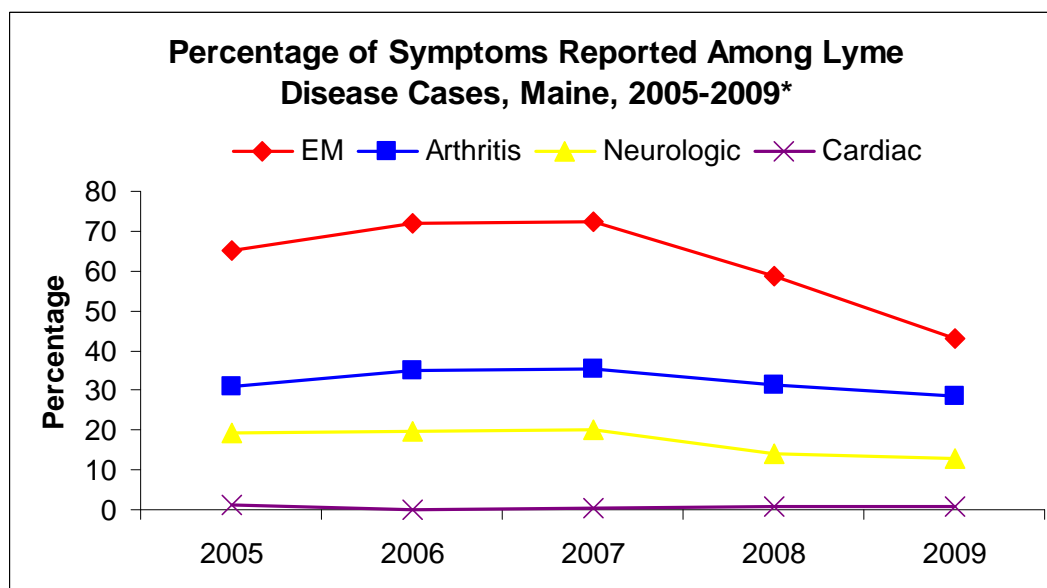


\*All 2009 data are preliminary as of 1/19/10, all data includes both confirmed and probable cases.





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\*All 2009 data are preliminary as of 1/19/10, all data includes both confirmed and probable cases.

## Appendix 2

### Peer-reviewed Medical Literature related to medical management and treatment of Lyme disease -- bibliography

#### Treatment of Lyme borreliosis.

Girschick HJ, Morbach H, Tappe D.  
Arthritis Res Ther. 2009;11(6):258. Epub 2009 Dec 17.  
PMID: 20067594 [PubMed - as supplied by publisher]

#### Implications of gender in chronic Lyme disease.

Wormser GP, Shapiro ED.  
J Womens Health (Larchmt). 2009 Jun;18(6):831-4.  
PMID: 19514824 [PubMed - indexed for MEDLINE]

#### A randomized, placebo-controlled trial of repeated IV antibiotic therapy for Lyme encephalopathy.

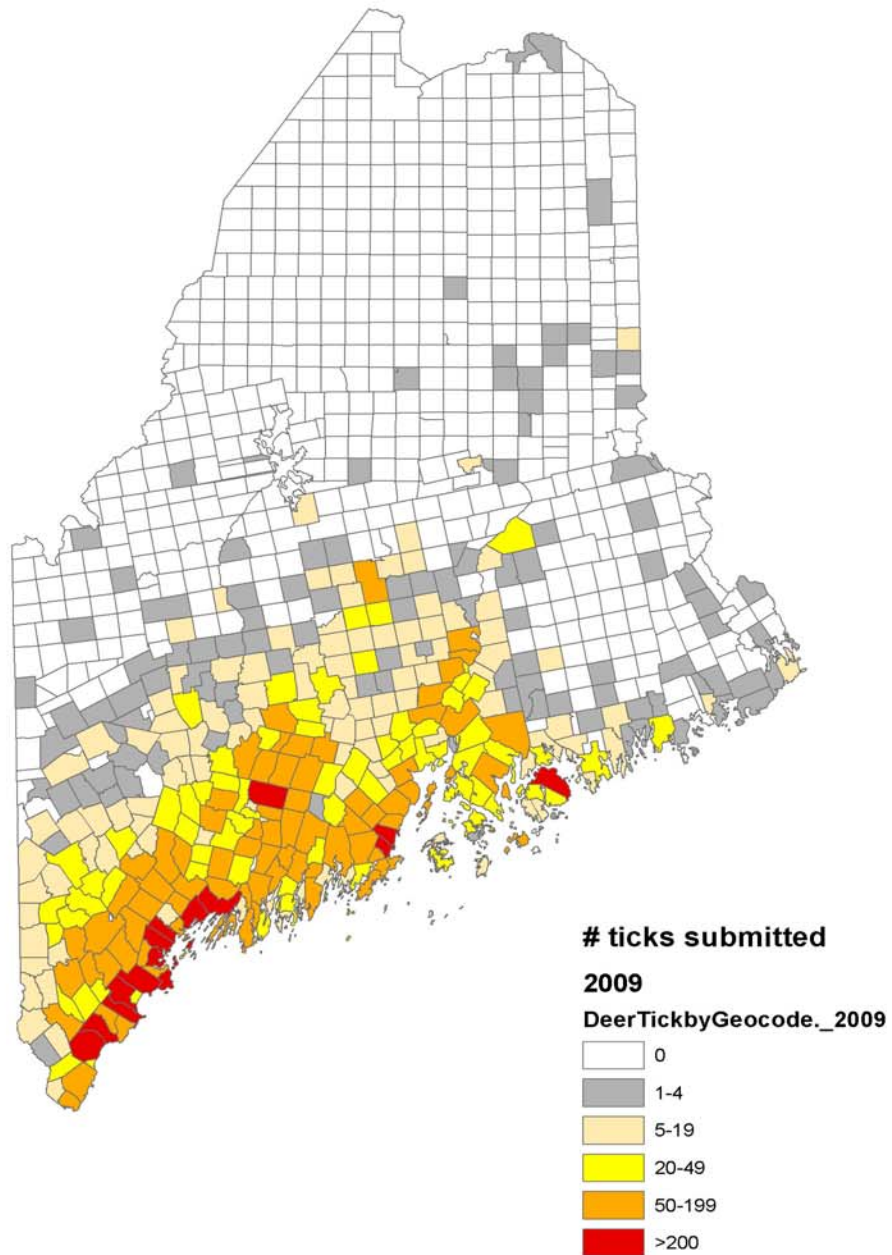
Fallon BA, Keilp JG, Corbera KM, Petkova E, Britton CB, Dwyer E, Slavov I, Cheng J, Dobkin J, Nelson DR, Sackeim HA.  
Neurology. 2008 Mar 25;70(13):992-1003. Epub 2007 Oct 10.  
PMID: 17928580 [PubMed - indexed for MEDLINE]

#### What should be done in case of persistent symptoms after adequate antibiotic treatment for Lyme disease?

Puéchal X, Sibilia J.  
Curr Probl Dermatol. 2009;37:191-9. Epub 2009 Apr 8.  
PMID: 19367104 [PubMed - indexed for MEDLINE]

## Appendix 3

Maine Medical Center Research Institute  
Vector-borne Disease Laboratory  
Deer Tick Submissions 1989 - 2009



## Appendix 4

### Physician Reference Guide



## Appendix 5



### 2009 Maine Tick and Mosquito Disease Seminar for Municipal Officers

May 7, 2009

York Library

#### Agenda

|          |  |
|----------|--|
| 8:00 AM  | Registration   |
| 8:30 AM  | Welcome and Introductions: <i>Kathleen F. Gensheimer, MD, MPH, State Epidemiologist, Maine CDC</i>   |
| 8:45 AM  | Mosquito and Tick-borne Diseases in Maine: <i>Eric Tongren, PhD, MSPH, EIS Officer, Maine CDC</i>  |
| 9:00 AM  | Ecology of Maine Mosquitos: <i>Michael Morrison, Mosquito Entomologist, Municipal Pest Management, and Ted St Amand, Atlantic Pest Solutions</i>   |
| 9:45 AM  | Ticks: Biology and Ecology: <i>Charles Lubelczyk, Field Biologist, Maine Medical Center Research Institution</i>   |
| 10:15 AM | Break  |
| 10:30 AM | Regulatory Concerns-Tick and Mosquito: <i>Gary Fish, Environmental Specialist, Department of Agriculture and Robert Stratton, Environmental Specialist, Department of Environmental Protection</i> |
| 11:15 AM | Deer Management in Maine Addressing the Public Interest: <i>Lee Kantar, Biologist, Inland Fisheries and Wildlife</i>   |
| 11:45 AM | Community Response to EEE: <i>Rob Yandow, Town Manager, York, Jon Carter, Town Manager, Kittery, and Henry Scipione, PHD, Superintendent of Schools</i>  |
| 12:20 PM | Tick and Lyme: <i>Sherrie Juris, Atlantic Pest Solutions and Special Guest: Doug Rafferty, WGME</i>  |
| 12:30 PM | Expert Panel: Questions and Answers  |
| 1:00 PM  | Adjourn  |



## Appendix 6

Feb. 09

|              |  |
|--------------|--|
| Acc. #:      |  |
| Date Rec.:   |  |
| Report Sent: |  |
| Date Ent.:   |  |

**TICK SUBMISSION FORM**  
Maine Medical Center Research Institute  
*Center for Vector-borne Disease*  
75 John Roberts Road – Suite 9B  
South Portland, ME 04106  
[www.mmcri.org/lyme/](http://www.mmcri.org/lyme/)  
[ticklab@mmc.org](mailto:ticklab@mmc.org)

As part of a program to monitor the distribution of the deer tick, *Ixodes scapularis*, the vector for the Lyme disease bacteria and other human pathogens, our research laboratory offers free identification of ticks. Ticks will **not be tested** to see if they contain the Lyme disease spirochete because the clinical value of this information is uncertain. Unless other arrangements have been made, ticks should be preserved in small bottles of 70% alcohol and mailed in a crush-proof container with this completed form to the above address. Please be sure to note the town where the tick was acquired and date tick found.

In the late spring and summer, many areas are infested with dog ticks, *Dermacentor variabilis*. This tick does not transmit Lyme disease. Because our laboratory can become overwhelmed by submissions of this tick, we ask that you not submit ticks on which you can distinguish the characteristic faint white markings unique to the dog tick.

To remove ticks, grasp them with fine forceps as near to the skin as possible and pull directly out firmly and steadily. The barbed mouth parts may not let go easily, so a minute or more may be required. Do not handle ticks with your bare hands.

Because we are interested in tick distribution, we may attempt to contact the person who originally collected the tick. If the tick is submitted by a clinic or other organization, please include the original collector's name and address. Please include name of guardian if under 18 years of age.

**A. Individual, physician, clinic, or organization submitting tick:**

Name: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_ Zip: \_\_\_\_\_

Phone: \_\_\_\_\_

E-mail: \_\_\_\_\_

**B. Person (or owner's name if pet) acquiring tick:**

Name: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_ Zip: \_\_\_\_\_

Phone: \_\_\_\_\_

E-mail: \_\_\_\_\_

Date tick found: \_\_\_\_ / \_\_\_\_ / \_\_\_\_ Town where acquired: \_\_\_\_\_ State: \_\_\_\_\_

Was the tick attached when found? ☐ Yes ☐ No Body part attached to: \_\_\_\_\_

Tick found on: ☐ Person (Age of person: \_\_\_\_\_) ☐ Animal ☐ Other: \_\_\_\_\_

If found on animal, what species? ☐ Dog (Breed: \_\_\_\_\_) ☐ Cat ☐ Other: \_\_\_\_\_

Animal's name: \_\_\_\_\_ Has animal been vaccinated for Lyme disease? ☐ Yes ☐ No

Were there any associated symptoms? \_\_\_\_\_

Patients or Physicians, please note any other pertinent information

\_\_\_\_\_

Lab use only:  
(do NOT write below line)

Tick Identification:

## Ticks in Maine – 2009

(Hard ticks – Family Ixodidae)

Ixodes scapularis (previously Ixodes dammini), the “deer tick”, also called the “black-legged tick”, is the principal vector of the Lyme disease spirochete in the northeastern United States. At some sites in Maine, particularly in southern ~~eastal~~ areas, over half of the adult ticks contain spirochetes, although infection rates vary considerably, even in adjacent areas. Infection rates of questing nymphs are typically somewhat lower. Immature stages feed on small mammals such as mice, while adult ticks prefer deer, but all stages may feed on humans and domestic animals. Less common in Maine, the agents of two other infectious diseases, human granulocytic anaplasmosis and babesiosis, may also be found in this species of tick. Although male deer ticks can be infected, they do not engorge with blood and are therefore not thought to be vectors of Lyme disease.

Ixodes cookei, the “woodchuck tick” is widely distributed in Maine and is the second most common species of Ixodes found. It has not been associated with Lyme disease transmission. Ixodes cookei usually feeds on wild animals, such as woodchucks and raccoons, but will also feed readily on humans and domestic animals. This tick is known to be a vector of Powassan virus. Rare cases of encephalitis have occurred in Maine in people infected with Powassan virus.

Ixodes marxi, the “squirrel tick”, has not been associated with Lyme disease. It is commonly found on squirrels but will occasionally bite humans.

Ixodes muris is occasionally found in Maine. Usually it is found only on voles and mice, but it may bite humans, cats, dogs, and birds. A recent report indicates that I. muris is a weak vector of Lyme disease. We have associated its bite with a reaction in dogs, cats and other domestic animals characterized by pain, swelling, fever, lethargy and loss of appetite. If this reaction is observed we are very interested in receiving the tick alive and with relevant information.

Ixodes angustus is usually found only on voles and mice and is common in many parts of Maine, but it is very rarely found on humans or domestic animals

Dermacentor variabilis, the “American dog tick”, is not a vector of Lyme disease. This tick is particularly abundant in southern Maine but its range has been expanding in recent years. Immature stages feed on voles and other small rodents, but adults are often found on humans, dogs, and other domestic animals. The adults, found from May through July and rarely later in the season, are larger than Ixodes ticks and can be distinguished by characteristic white markings (see back). This tick is the vector of Rocky Mountain spotted fever in the eastern United States. There have not been cases of Rocky Mountain spotted fever reported from Maine.

Dermacentor albipictus, the “winter tick” or “moose tick”, is found on moose and deer and occasionally on horses, cows, dogs and humans, particularly in central and northern Maine. Large numbers of the tiny larvae may be encountered in the fall, particularly in habitat where moose are found. This tick has not been associated with Lyme disease but has been shown to be responsible for moose mortality in northern New England in the winter.

Haemaphysalis leporispalustris, the “rabbit tick”, is usually found only on rabbits and birds. Although it has rarely been reported to be infected with the Lyme disease bacteria, it has not been associated with Lyme disease in humans.

Amblyomma americanum, the “Lone Star tick”, is most often found on people traveling from states to the south where it is very common, but is becoming more frequently acquired in Maine. It has been shown to carry a different spirochete, which in humans may produce a rash and some symptoms similar to Lyme disease.

Rhipicephalus sanguineus, the “brown dog tick” or “kennel tick”, is widely distributed over the world, but only rarely found in Maine. Dogs are the principal host. It has not been associated with Lyme disease transmission, but is the vector of canine ehrlichiosis (Ehrlichia canis).

Other species of Ixodes, I. brunneus, (found on migratory birds), I. dentatus, (found on rabbits and hares), I. uriae, (found on marine birds) and I. gregsoni (found on mink, weasel and fisher) have occurred in Maine. The “bird tick” Haemaphysalis chordeilis and Ixodes banksi (found on beaver and muskrat) have not yet been found in Maine but may occur here. There is no record of soft ticks, Family Argasidae, in Maine.

Elsewhere in the country, ticks may carry other diseases such as Rocky Mountain spotted fever, tularemia, and Q -fever. As yet, these have not been reported or are rare in Maine.

**Maine Medical Center Research Institute ~ Center for Vector-borne Disease**

**75 John Roberts Road, Suite 9B ~ South Portland ME 04106**

**[ticklab@mmc.org](mailto:ticklab@mmc.org)**



# CAUTION!

## DEER TICK HABITAT



**Top Row:** The Deer Tick which transmits Lyme disease. From left to right (enlarged images): nymph, adult male, and adult female.

**Bottom Row:** The American Dog Tick, which does not transmit Lyme disease. From left to right (enlarged images): adult male and adult female.

Deer ticks can carry Lyme disease and other diseases that are a health risk to people and their pets. They are found in shrubby woodlands and the edges of forests.

Deer tick nymphs are found **May through July**.

Adult ticks are found **October through November** and **April through June**.

### To Prevent Tick Bites:

- Wear light-colored clothing and tuck pantlegs into socks.
- Use a tick repellent such as DEET.
- Inspect yourself and your clothes closely for ticks.
- Shower and wash clothes as soon as possible.
- Stay on the trails!

**Prompt removal of attached ticks is extremely important!** Ticks need to attach for 36 hours to transmit Lyme disease. Ticks attach at body folds, behind the ears, and in the hair.

*Produced by the Maine Medical Center Research Institute with financial assistance from the Elmina B. Sewell Foundation.*



### If bitten by a deer tick...

If you remove a deer tick that has become engorged while feeding, you should consult your physician right away, since a single dose of antibiotic given within 72 hours of the bite has been shown to prevent Lyme disease. Remember to save the tick for later identification (see following page).

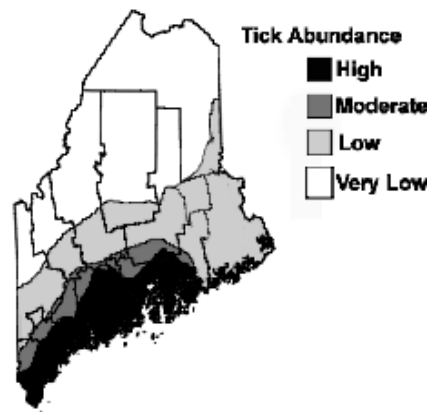
**The first symptom of Lyme disease** in humans is usually an expanding red rash greater than 2 inches in diameter at the site of the tick bite which may occur within a few days or several weeks later. The rash may be preceded or accompanied by flu-like symptoms such as fever, headache, chills, nausea, facial paralysis, or pain in the muscles and joints. If Lyme disease is suspected, call your doctor immediately. Early antibiotic treatment is very effective and can prevent later, more serious, complications. Not all patients develop the rash, however, and many do not recall a tick bite. The bites of ticks, mosquitoes, and black flies can produce a red, itchy, swollen area that may persist for a week or so but is usually less than 2 inches in diameter.

**Lyme disease in pets.** Although cats rarely show symptoms of Lyme disease, dogs may be seriously affected. The first indications include lameness, loss of appetite, fever, and lethargy. Dogs usually respond well to prompt antibiotic treatment. If deer ticks are abundant, dog owners should consult with veterinarians about canine Lyme vaccines available. Tick collars or other anti-tick treatments should also be used.

**Other tick-borne pathogens.** Two other deer tick-transmitted diseases, human granulocytic anaplasmosis and babesiosis, occur in Maine. These infections may start with headaches, fever and other flu-like symptoms, but without the characteristic bulls-eye rash of Lyme disease. Cats, dogs, and horses may suffer clinically from anaplasmosis. We suggest contacting your veterinarian if you find a tick on your pet. Powassan encephalitis virus has also been found in Maine and to date has resulted in four human cases. It is spread by the woodchuck tick *Ixodes cookei*.

### The deer tick in Maine

This map shows a very generalized picture of the location and abundance of deer ticks in Maine through 2007. Although most often found in coastal areas, increasing numbers of ticks have been found inland. Continuing research will update this range and study the ecological variables which influence the spread.



**Tick identification.** If you find ticks you think may be deer ticks and would like to have them identified, send them in a small vial of alcohol in a crushproof container to the laboratory listed below. Include the name and age, if from a person, type of animal or source, the location where acquired, and the date found. **Submitted ticks are not tested for the Lyme disease spirochete.**

Maine Medical Center Research Institute  
Center for Vector-borne Disease  
75 John Roberts Rd. - Suite 9B  
South Portland, ME 04106  
<http://www.mmcri.org/lyme/>  
email: [ticklab@mmc.org](mailto:ticklab@mmc.org)



## PROTECTING YOURSELF FROM LYME DISEASE IN MAINE

**Lyme disease** is an illness caused by a corkscrew-shaped bacterium (a spirochete) that is transmitted to humans and domestic animals by the bite of a tick. Frequently starting with a rash and flu-like symptoms, Lyme disease, if untreated, may progress to cause arthritis and neurological problems. Over 2500 cases of Maine-acquired Lyme disease have now been officially recognized.

The tick that transmits Lyme disease is the deer tick, *Ixodes scapularis*. This tick is well established in southern areas, particularly in coastal counties, but is increasingly found in interior Maine as well.

The risk to humans of contracting Lyme disease is greatest from the bite of the inconspicuous nymphs, which are most active in June and July. Adult ticks are found most often in the fall and in early spring as they search for larger hosts, primarily deer. The larger, reddish females can also transmit the Lyme bacteria, but the smaller, black males do not attach long enough to do so.



Female

Male

Adult Dog Ticks (*Dermacentor variabilis*)

Photos by Kevin Byron.



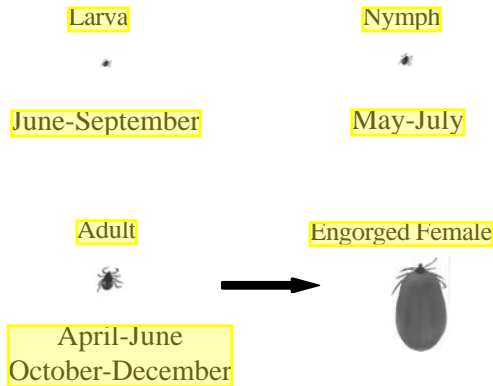
Female

Male

Adult Deer Ticks (*Ixodes scapularis*)

The deer tick, which transmits Lyme disease (left), and the common dog tick (right), enlarged for comparison. The dog tick is not thought to transmit Lyme disease.

## THE ACTUAL SIZE OF DEER TICKS



**Not all deer ticks contain the spirochete.** Field studies in Maine have shown that although in some sites more than half the adult ticks sampled were infected, infection rates may vary considerably, even between adjacent areas at the same location.

**Thirteen other species of ticks have been found in Maine,** some of which look very much like deer ticks. They may bite humans and domestic animals but are not thought to transmit Lyme disease.

*Ixodes cookei*, the 'woodchuck tick,' which cannot be reliably distinguished from the deer tick without a microscope, is widely distributed in Maine. It usually feeds on wild animals such as woodchucks and skunks, but will also feed readily on humans and domestic animals.



Actual size

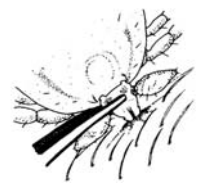
*Dermacentor variabilis* (shown), the American 'dog' tick, is commonly found in late spring and early summer. It is larger than the *Ixodes* ticks and can be distinguished by its characteristic white markings. It is **not** found October-December in Maine.

## Precautions to avoid tick bites:

- Wear light-colored clothing and tuck your pants into your socks and your shirt into your pants when walking in the woods, brush, or tall grass. Deer ticks attach to clothing and move upwards.
- Use a repellent containing DEET according to label instructions - particularly on shoes, socks, and pant legs. (Use caution in applying high-concentration products to the skin, especially on children.)
- People may pretreat clothing with a permethrin-containing product, which both repels and kills ticks. **Caution:** This is not for use on skin; use only as directed on the label.
- To prevent engorged ticks from reproducing near your home and to protect your pets, consult your veterinarian about tick repellents and acaricides.
- **Inspect yourself, your clothing, your children, and your pets for ticks when you come in from the field and then again in a few hours.** Ticks often attach at body folds, behind the ears, and in the hair. If possible, shower and wash clothes immediately. Heat drying is effective in killing ticks.
- Mowing grass and cutting brush may reduce tick habitats in problem areas.
- When transporting pets or game, caution should be taken to avoid bringing ticks to new areas.

**Prompt removal of attached ticks is extremely important.** Lyme disease is rarely transmitted before the tick has been attached for 36 hours. Using tweezers, grasp the tick as close to the skin as possible and pull until the tick

lets go. Do not handle ticks with bare hands. Do not squeeze the tick. Apply antiseptic to the bite. Save the tick in a small vial of 70% alcohol. Tick removal methods, such as applying vaseline, nail polish or scorching with a match, are not recommended.



Drawing by K. Wolfe

## Appendix 7

### Tick Removal Kit





## Appendix 8

### Recent Lyme Legislation

#### Federal:

Title: Lyme and Tick-Borne Diseases Prevention, Education, and Research Act of 2009 (H.R. 1179)  
Status: Did not pass

#### California:

Title: Lyme Disease Awareness Month (Assembly Concurrent Resolution 18)  
Status: Passed

#### Connecticut:

Title: An act concerning the use of long-Term Antibiotics for the treatment of Lyme Disease (House Bill 5625)  
Status: Did not pass

Title: An act concerning the use of long-Term Antibiotics for the treatment of Lyme Disease (House Bill 6200)  
Status: Passed

#### Kansas:

Title: A Resolution recognizing May as Lyme Disease Awareness Month (House Resolution 6029)  
Status: Passed

#### Maryland:

Title: An ACT concerning Licensed Physicians Treatment of Lyme Disease (House Bill 290)  
Status: Introduced in the Maryland House of Delegates 01/27/2010

#### Massachusetts:

Title: An Act relative to tick borne illnesses (House Bill 3592)  
Status: Did not pass

Title: An Act relative to the treatment of chronic Lyme disease (House Bill 1148)  
Status: Did not pass

Title: An Act relative to Lyme Disease treatment coverage (House Bill 1038)  
Status: Did not pass

#### Minnesota:

Title: Long-Term Antibiotic Therapy for Chronic Lyme Disease (Senate File 1631)  
Status: Did not pass

Title: Long-Term Antibiotic Therapy for Chronic Lyme Disease (House File 2597)  
Status: Referred to House Health Care and Human Services Policy and Oversight Committee (01/07/2010)

### **New Hampshire:**

Title: An ACT relative to the use of long-term antibiotics for the treatment of Lyme disease (House Bill 1326)  
Status: Committee hearing scheduled (01/28/2010)

### **New Jersey:**

Title: An Act Requiring Health Insurance Benefits for the Treatment of Lyme Disease (Assembly Bill 326)  
Status: Did not pass

### **New York:**

Title: An act to amend the insurance law and the workers compensation law, in relation to coverage of long term medical care for Lyme disease and other tick borne related pathogens  
Status: Did not pass

Title: Memorializing Governor David A Paterson to proclaim May 2009, as Lyme Disease Awareness Month in the State of New York (J948)  
Status: Passed

### **Pennsylvania:**

Title: Lyme Disease Awareness Month (House Resolution 188 and Senate Resolution 106)  
Status: Passed

Title: Lyme Disease Education, Prevention and Treatment Act (Senate Bill 346)  
Status: Did not pass

Title: Lyme and Related Tick-Borne Disease Education, Prevention and treatment Act (House Bill 894)  
Status: Did not pass

Title: Lyme and Related Tick-Borne Disease Education, Prevention and Treatment Act (Senate Bill 1199)  
Status: Introduced and referred to the Senate Committee on Banking and Insurance (1/26/2010)

### **Texas:**

Title: An ACT requesting joint interim legislative study on the availability of medical treatment for patients with Lyme disease in Texas (House Concurrent Resolution 152)  
Status: Did not pass

Title: Urging greater public awareness of Lyme disease (House Resolution 767)  
Status: Did not pass

## **Vermont:**

Title: An ACT Relating to Lyme Disease Treatment and Education (House Bill 207)  
Status: Did not pass

## **Virginia:**

Title: Lyme disease; reporting and treatment (House Bill 1017)  
Status: Referred to House Committee on Health, Welfare and Institutions (01/13/2010)

Title: Lyme disease; reporting and treatment (House Bill 897)  
Status: Referred to House Committee on Health, Welfare, and Institutions (01/13/2010)

Title: Lyme disease, allows a licensed physician to prescribe long-term antibiotic therapy (House Bill 512)  
Status: referred to House Committee on Health, Welfare and Institutions (01/12/2010)

## **West Virginia:**

Title: Lyme Disease Awareness Month (House Concurrent Resolution 24)  
Status: Did not pass

Title: Lyme disease insurance coverage (House Bill 2605)  
Status: Introduced and referred to the House Committee on Banking and Insurance and the House Judiciary Committee (01/13/2010)