

Unit 2 Project: Disease Prevention

Name: _____

Points: _____

Theme/Title of Lesson: Lyme Disease By The Numbers!

Specific Objectives and Outcomes:

Students will be able to:

- ✓ Read graphs and charts for information
- ✓ Create a bar graph
- ✓ Use ratio and proportion for dosage calculations
- ✓ Provide estimation
- ✓ Use Order of Operations in applied problems

Materials/Handouts/Web links:

+PROJECT QUESTIONS

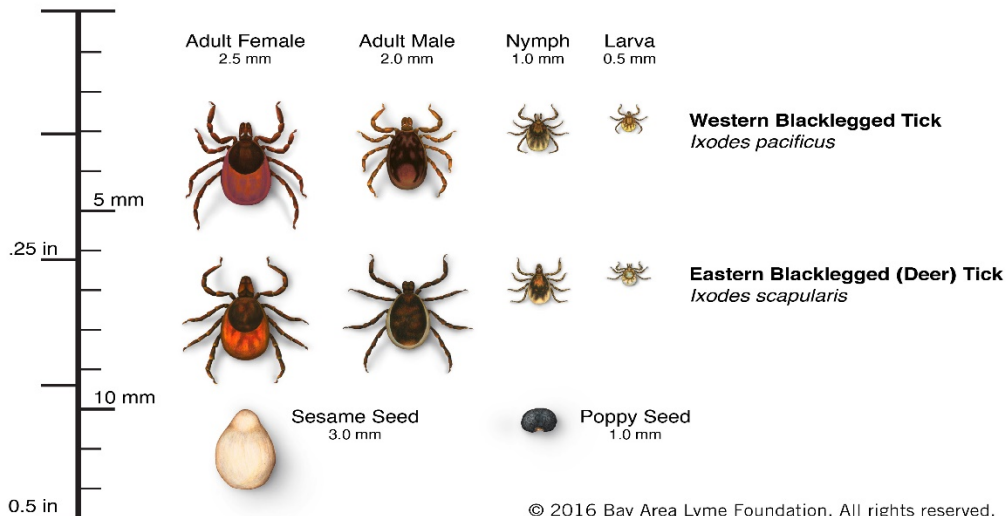
+Lyme disease treatment for humans

+Flea and Tick treatment product chart

+Data on Lyme Disease

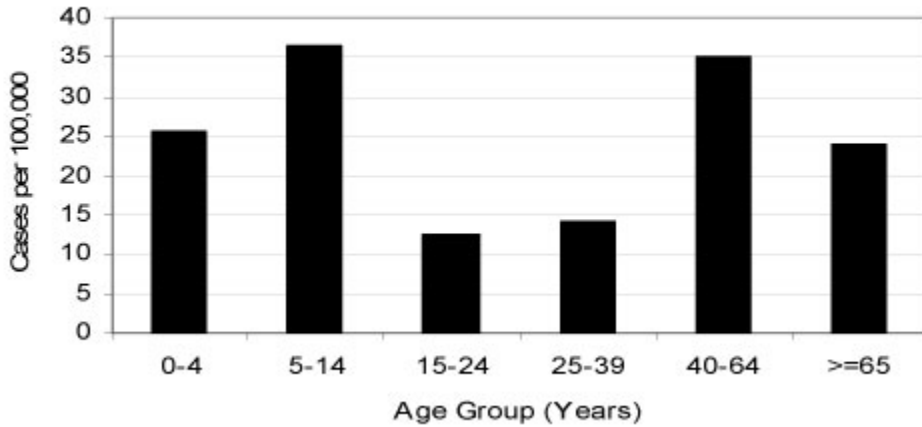
Map_reported cases_2017-P

Introduction: Lyme Disease is a disease that is caused by a bacterium that is transmitted through the bite of a Black-legged tick. According to the Centers for Disease Control, 30,000 cases per year are reported, but they estimate as many as 300,000 cases occur per year in the United States. The Northeast and the Midwest are particularly hard hit by this disease.

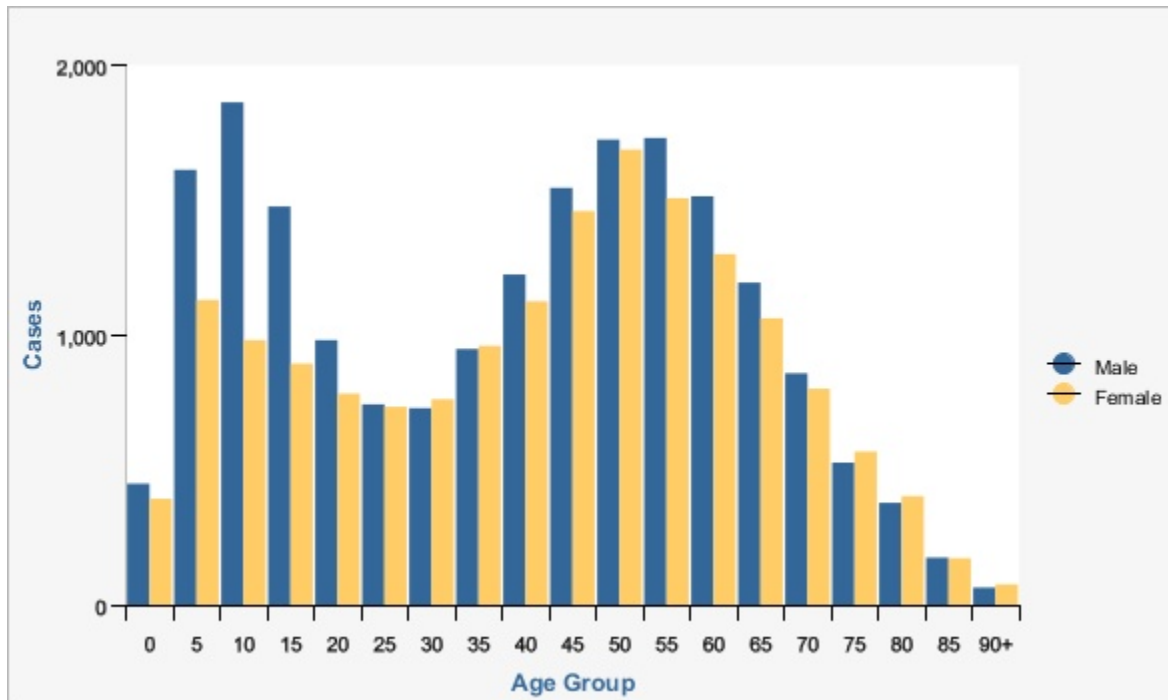


Data on Lyme Disease




















Lyme Disease by Age Group - Maine, 2006



Confirmed Lyme Disease Cases by Age and Gender, New Jersey, 2007-2017



Flea and Tick Treatment for Pets: *Product Comparison*

<i>Fleas & Ticks</i>		PRODUCT COMPARISON					
Product	Type	App	 Adult Fleas	 Flea Eggs	 Ticks	 Mosquitos	 Chewing Lice
FRONTLINE[®] Plus		Topical	✓	✓	✓		✓
FRONTLINE[®] Top Spot		Topical	✓		✓		✓
FRONTLINE[®] Top Spot		Topical	✓	✓	✓		
K9 advantix[®] II		Topical	✓	✓	✓	✓	✓
advantage[®] II for Cats		Topical	✓	✓			
advantage[®] II for Dogs		Topical	✓				✓
Capstar[®]		Oral	✓				
PETARMOR[®] for Dogs		Topical	✓		✓		✓
PETARMOR[®] for Cats		Topical	✓		✓	✓	✓
CERTIFECT		Topical	✓	✓	✓		✓
FIPROGUARD[®]		Topical	✓		✓		✓
FIPROGUARD[®] MAX		Topical	✓		✓		✓
seresto[®]		Collar	✓	✓	✓		✓
EFFITIX[®]		Topical	✓		✓	✓	✓

Lyme Disease Treatment for Humans

People treated with appropriate antibiotics in the early stages of Lyme disease usually recover rapidly and completely. Antibiotics commonly used for oral treatment include doxycycline, amoxicillin, or cefuroxime axetil. People with certain neurological or cardiac forms of illness may require intravenous treatment with antibiotics such as ceftriaxone or penicillin.

Treatment regimens listed in the following table are for localized ([early](#)) Lyme disease. See references below (Hu 2016; Sanchez 2016) for treatment of patients with disseminated ([late](#)) Lyme disease. These regimens are guidelines only and may need to be adjusted depending on a person's age, medical history, underlying health conditions, pregnancy status, or allergies.

Age Category	Drug	Dosage	Maximum	Duration, Days
Adults	Doxycycline	100 mg, twice per day orally	N/A	10-21*
	Cefuroxime axetil	500 mg, twice per day orally	N/A	14-21
	Amoxicillin	500 mg, three times per day orally	N/A	14-21
Children	Amoxicillin	50 mg/kg per day orally, divided into 3 doses	500 mg per dose	14-21
	Doxycycline	4 mg/kg per day orally, divided into 2 doses	100 mg per dose	10-21*
	Cefuroxime axetil	30 mg/kg per day orally, divided into 2 doses	500 mg per dose	14-21

*Recent publications suggest the efficacy of shorter courses of treatment for early Lyme disease.

NOTE: *For people intolerant of amoxicillin, doxycycline, and cefuroxime axetil, the macrolides azithromycin, clarithromycin, or erythromycin may be used, although they have a lower efficacy. People treated with macrolides should be closely monitored to ensure that symptoms resolve*

The National Institutes of Health (NIH) has funded several studies on the treatment of Lyme disease that show most people recover when treated within a few weeks of antibiotics taken by mouth. In a small percentage of cases, symptoms such as fatigue (being tired) and muscle aches can last for more than 6 months. This condition is known as "[Post-treatment Lyme Disease Syndrome](#)" (PTLDS), although it is often called "chronic Lyme disease." For details on research into "chronic Lyme disease" and long-term treatment trials sponsored by NIH, visit the [National Institutes of Health Lyme Disease web site](#).

References

- Hu LT. Lyme Disease. *Ann Intern Med.* 2016 Nov 1;165(9):677.

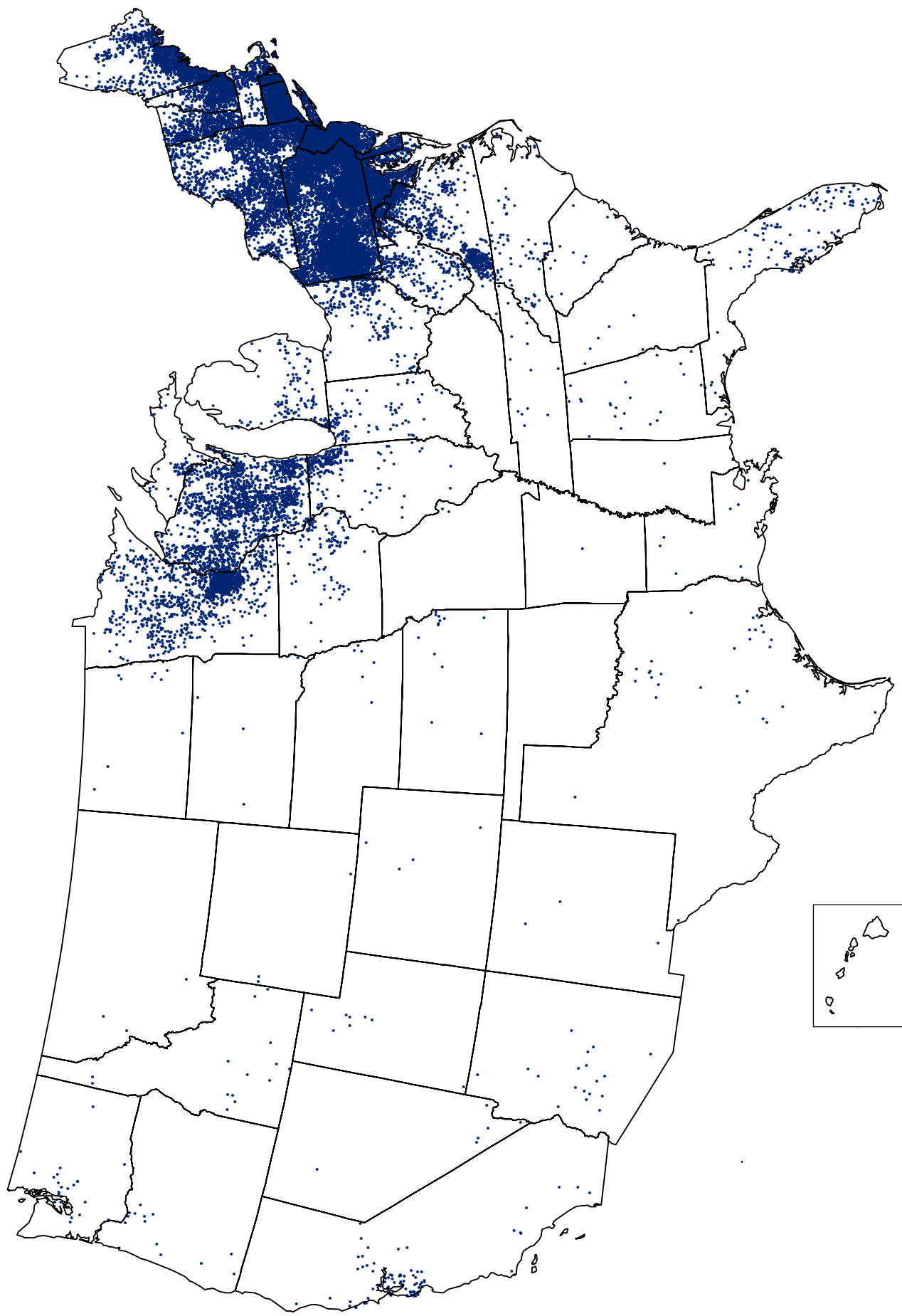
- Kowalski TJ, Tata S, Berth W, Mathiason MA, Agger WA. Antibiotic treatment duration and long-term outcomes of patients with early Lyme disease from a Lyme disease-hyperendemic area. *Clin Infect Dis*. 2010;50(4):512-520.
- Sanchez E, Vannier E, Wormser GP, Hu LT. Diagnosis, treatment, and prevention of Lyme disease, human granulocytic anaplasmosis, and babesiosis: A review. *JAMA*. 2016 Apr 26;315(16):1767-77.
- Stupica D, Lusa L, Ruzić-Sabljić E, Cerar T, Strle F. Treatment of erythema migrans with doxycycline for 10 days versus 15 days. *Clin Infect Dis*. 2012;55(3):343-350.

- Page last reviewed: December 1, 2017
- Page last updated: December 1, 2017
- Content source:
 - [Centers for Disease Control and Prevention](#)
[National Center for Emerging and Zoonotic Infectious Diseases \(NCEZID\)](#)
[Division of Vector-Borne Diseases \(DVBD\)](#)

- 1600 Clifton Road Atlanta, GA 30329-4027 USA
 800-CDC-INFO (800-232-4636), TTY: 888-232-6348
[Email CDC-INFO](#)
- [U.S. Department of Health & Human Services](#)
[HHS/Open](#)
[USA.gov](#)

Reported Cases of Lyme Disease -- United States, 2017

https://www.cdc.gov/lyme/resources/reportedcasesoflymedisease_2017-P.pdf



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

Use the *Flea and Tick Treatment for Pets-Product Comparison* page to answer questions 5-11.

- 5) How many total treatment options are available to treat pets in defense of ticks and/or fleas?

- 6) Of those, how many treat ticks? Write this as a fraction in reduced form.

- 7) Out of all the products listed, how many products can treat both adult fleas and flea eggs together? Write this as a fraction in reduced form.

- 8) Out of all the products listed, how many products can treat all five pests? Write this as a fraction in reduced form.

- 9) Out of the products that protect against ticks, how many also protect against chewing lice? Write this as a fraction in reduced form.

- 10) Out of all the products listed, how many products protect against flea eggs, ticks and mosquitoes together? Write this as a fraction in reduced form.

11) In the space below, create a bar graph comparing product names to the number of pests their product protects against.

Use the Data on Lyme Disease page to answer questions 12-15.

12) According to the graph: *Lyme Disease by Age Group-Maine, 2006*, approximately how many people (per 100,000) contracted Lyme disease who were between 5 and 14 years of age? If the total population of Maine was 1.3 million at that time, how many total people in that age group contracted Lyme disease? (Show your work below)

13) According to the same graph, approximately how many people contracted Lyme Disease in Maine in 2006? (Hint: The population of Maine in 2006 was 1.3 million people)

14) According to the graph: *Confirmed Lyme Disease Cases by Age and Gender, New Jersey, 2007-2017*, approximately how many males contracted Lyme disease who were about 10 years of age? Compare that to females of the same age. What is the difference between these two numbers?

15) According to the same graph, which age group has the least difference in the number of confirmed cases between males and females?