

<p>How a Tick Can Make You Sick</p> <p>Module 1: What is Lyme disease?</p>		

www.LymeDiseaseAssociation.org

Pat Smith
President
Lyme Disease Association, Inc.

www.LymeDiseaseAssociation.org
1-888-366-6611
Lymeliter@aol.com
Pat Smith, President

Did you know that a single tick can make you sick and that ticks can transmit an illness called Lyme disease to you and to your pets? In this brief, online session, get ready to learn tons about ticks, the diseases that they carry, and how you can protect yourself and your pets from tick-borne illnesses. Ready? Let's go.

How a Tick Can Make You Sick | September 14, 2008 | Version 1

What Do You Know?



Before you start the class,
let's see how much you know about

Lyme disease.

Click the link below to access the Pre-Test.
After you finish the Pre-Test, return to the class.

[Pre-Test](#)

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Let's get started!

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Pronunciations



tularemia

ehrlichiosis

spirochete

You will learn many words today that are difficult to pronounce. To help you, we have provided a PRONUNCIATION PAGE link on the Notes page of each slide.

Borrelia burgdorferi

Copy and paste the link into a browser window to open the Pronunciation Page in a new window. To return to the class, close the Pronunciation Page window.

Pronunciation Guide:

http://lymediseaseassociation.org/ledu/pron_guide.html

Today's topic



Over the next half-hour, we will review the following topic:

- What is Lyme disease?



Other modules available in this series are:

- **Module 2: Tick-er Tape Parade:**
What are ticks and what do they look like?
- **Module 3: Keeping ticks at bay when you go out to play**
- **Module 4: Testing and treatment for Lyme disease**

Pronunciation Guide:

http://lymediseaseassociation.org/ledu/pron_guide.html



What is Lyme disease?

What is Lyme disease?

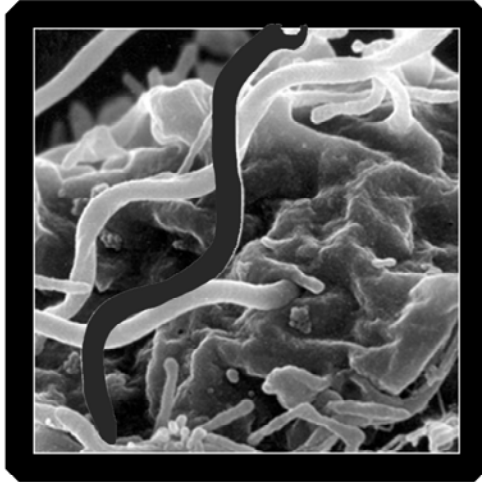


Photo courtesy of Dr. David W. Dorward, NIH, Rocky Mountain Labs, MT
Borrelia entering human B cell where it destroys the cell instead of the cell destroying the *Borrelia* as it is supposed to do.

Lyme disease is an illness caused by a bacterium called *Borrelia burgdorferi*.

This bacterium belongs to a class of bacteria called spirochetes.

ETYMOLOGY ALERT



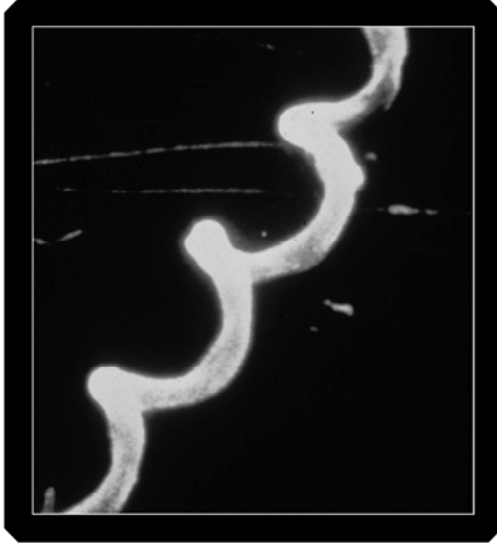
Bacteria | Originally from the Greek *baktéria*, staff or rod.

Bacterium is the singular form, bacteria is the plural.

Pronunciation Guide:

http://lymediseaseassociation.org/ledu/pron_guide.html

What is Lyme disease?



More about the SPIROCHETE:

- Shaped like a corkscrew
- Uses its shape to move on its own, like a circus performer on a pogo stick

ETYMOLOGY ALERT

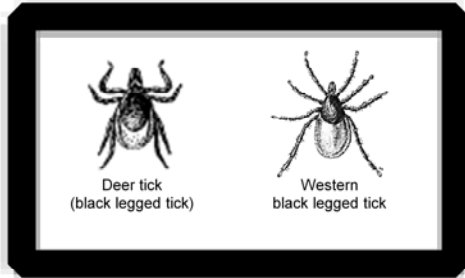


Spirochete | Originally from the Greek *speira*, in a spiral, and *khaitē*, long hair.

Pronunciation Guide:

http://lymediseaseassociation.org/ledu/pron_guide.html

What is Lyme disease?



How does this bacterium get into humans and animals and cause Lyme disease?

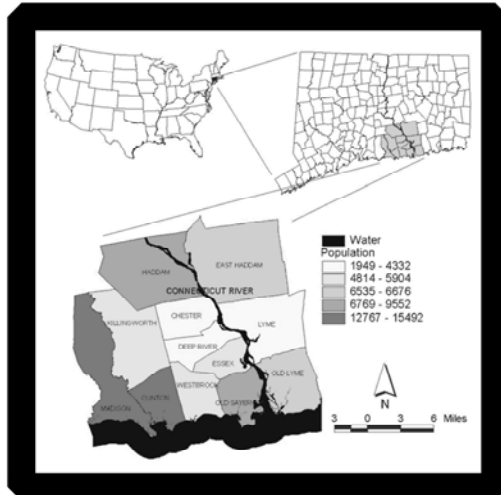
That's where the tick comes in.

Humans and animals get *Borrelia burgdorferi* — and as a result, Lyme disease — after they are bitten by a tick that is carrying the bacterium.

Pronunciation Guide:

http://lymediseaseassociation.org/ledu/pron_guide.html

What is Lyme disease?



LYME DISEASE is named after a town in Connecticut called Lyme, where it was first recognized.

That's where a local Mom noticed that many children in her family and in her neighborhood were sick.

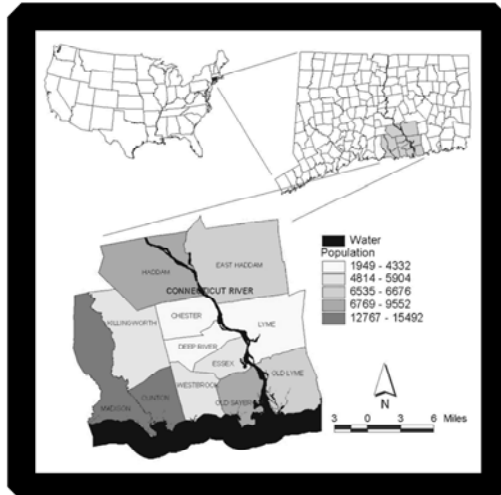
Map courtesy of the Centers for Disease Control and Prevention.

Surveillance area: 12-town area around Lyme, Connecticut.
Published September 2002.

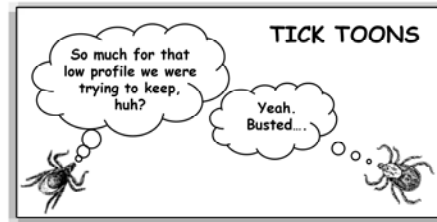
Pronunciation Guide:

http://lymediseaseassociation.org/ledu/pron_guide.html

What is Lyme disease?



She asked the Health Department to investigate and the rest is history.



Map courtesy of the Centers for Disease Control and Prevention.

Surveillance area: 12-town area around Lyme, Connecticut.
Published September 2002.

Pronunciation Guide:

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Tick-ing time bombs



Lyme disease is spread by the bite of certain kinds of ticks. These ticks are like tiny, ticking time bombs.

They can infect a human or an animal with Lyme disease and other illnesses without warning.



Pronunciation Guide:

http://lymediseaseassociation.org/ledu/pron_guide.html

Tick-ing time bombs

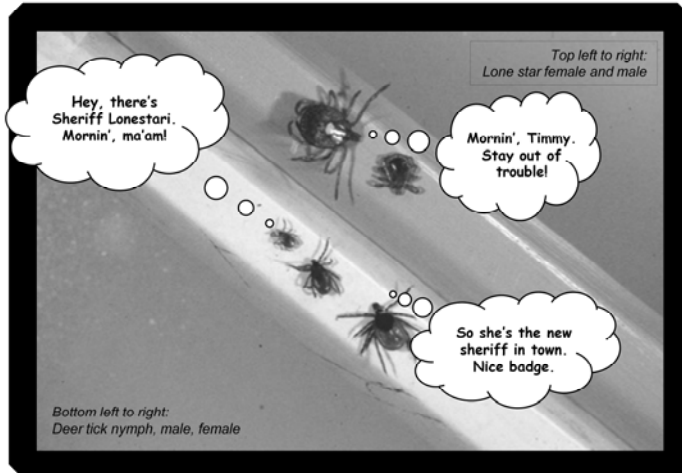


Photo courtesy of James L. Occi, MA, MS

Two tick species are shown here:

The LONE STAR TICK and the DEER TICK.

Lone star ticks are particularly feisty....

Pronunciation Guide:

http://lymediseaseassociation.org/ledu/pron_guide.html



A note about the lone star tick....

While most ticks hang out on plants or blades of grass, waiting for you or your pet to brush by them, the lone star tick actually will run after you—like a sheriff chasing down a bandit.



In fact, the lone star tick is named for the single, white spot on the female's back.

I guess she takes that "badge" pretty seriously, huh?

Pronunciation Guide:

http://lymediseaseassociation.org/ledu/pron_guide.html

Who can get Lyme disease?



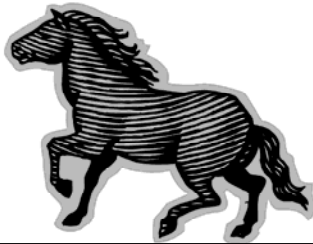
Potential targets include:

- People
- Animals
- Pets



Say what?!?

In fact, your pet can be a carrier for ticks which can then hop onto you if they have not attached to your pet.



Pronunciation Guide:

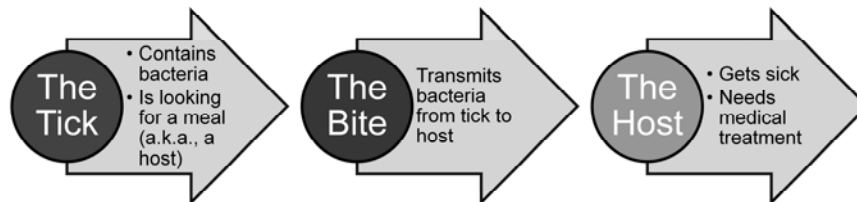
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How do we get Lyme disease?

A **VECTOR** is another name for an insect or arachnid that transmits a disease to animals or humans.

The vector for Lyme disease is the **TICK**.



DEFINITION:

Arachnid | An animal with four pairs of legs, no wings or antennae; includes spiders, scorpions, harvestmen, ticks, and mites.

Pronunciation Guide:

http://lymediseaseassociation.org/ledu/pron_guide.html

How do we get Lyme disease?



Adult Deer Tick

The tick sucks blood from its host and when fully fed, drops off.

Unfortunately, however, the tick sometimes transmits illnesses, such as Lyme disease, before it drops off.

WHO KNEW?

Ticks are related to spiders, having eight legs, while insects have six. In the larval stage — meaning when it has just hatched from an egg — a tick has just six legs, but two more appear later.



Pronunciation Guide:

http://lymediseaseassociation.org/ledu/pron_guide.html

Lyme disease and other tick-borne illnesses



Aside from the Lyme disease bacteria, ticks can transmit one or more diseases with just one bite.

For example, deer ticks not only transmit the Lyme disease bacteria, but also other dangerous disease-causing organisms.

These other diseases may cause symptoms similar to those caused by Lyme disease.



Pronunciation Guide:

http://lymediseaseassociation.org/ledu/pron_guide.html

Co-infections



So a person or animal bitten by a tick may develop just Lyme disease, a different disease altogether, or several illnesses at the same time.

When you have more than one illness at the same time, they are called CO-INFECTIONS.

On the next several slides, you will learn more about the other diseases that ticks can transmit.



Pronunciation Guide:


http://lymediseaseassociation.org/ledu/pron_guide.html

Ticks and the diseases they transmit



The **black legged tick**, most commonly known as the **deer tick**, is famous (or should we say, infamous?) for transmitting Lyme disease.

It also can transmit a host of other tick-borne illnesses as shown here.

TICK PIC	COMMON DISEASE ORGANISM	RELATED ILLNESS
 Deer tick (black legged tick)	<i>Borrelia burgdorferi</i>	Lyme disease
	<i>Babesia microti</i> <i>Babesia MO-1</i>	Babesiosis
	<i>Anaplasma phagocytophilum</i>	Anaplasmosis
	POW virus	Powassan encephalitis
	<i>Francisella tularensis</i>	Tularemia
	<i>Bartonella henselae</i> / <i>Bartonella spp.</i>	Tick-borne bartonella
	a neurotoxin (not an actual organism)	Tick paralysis

Pronunciation Guide:


http://lymediseaseassociation.org/ledu/pron_guide.html

Ticks and the diseases they transmit



The **Western black-legged tick** is found primarily in the western states, such as California. Like its cousin the deer tick, it can transmit *Borrelia burgdorferi*, the bacterium that causes Lyme disease.

It also transmits other illnesses including babesiosis, anaplasmosis and tick-borne bartonella.

TICK PIC	COMMON DISEASE ORGANISM	RELATED ILLNESS
 <p>Western black legged tick</p>	<i>Borrelia burgdorferi</i>	<i>Lyme disease</i>
	<i>Babesia WA1</i>	<i>Babesiosis</i>
	<i>Anaplasma phagocytophilum</i>	<i>Anaplasmosis</i>
	<i>Bartonella henselae / Bartonella spp.</i>	<i>Tick-borne bartonella</i>


Pronunciation Guide:

http://lymediseaseassociation.org/ledu/pron_guide.html

Ticks and the diseases they transmit



The **lone star tick** is wide-spread in the United States ranging from Texas to Iowa in the Midwest, and east to the coast where it can be found as far north as Maine. It is named for the single white spot that appears on the female's back. This tick transmits a bacterium called *Borrelia lonestari*.

TICK PIC	COMMON DISEASE ORGANISM	RELATED ILLNESS
 Lone star tick (female)	<i>Borrelia lonestari</i>	May possibly be the cause of STARI (Southern tick-associated rash illness)
	<i>Ehrlichia chaffeensis</i> , <i>Ehrlichia ewingii</i>	Human monocytic Ehrlichiosis (HME)
	<i>Francisella tularensis</i>	Tularemia
	<i>Rickettsia rickettsii</i>	Rocky Mountain spotted fever
	caused by a neurotoxin (not an actual organism)	Tick paralysis

Pronunciation Guide:


http://lymediseaseassociation.org/ledu/pron_guide.html

Ticks and the diseases they transmit



The **American dog tick** transmits diseases as well, most notably Rocky Mountain spotted fever, which, if left untreated, can be deadly.

It occurs in most areas of the U.S., especially in the Mid Atlantic, Southeastern, and Midwestern states.

TICK PIC	COMMON DISEASE ORGANISM	RELATED ILLNESS
 American dog tick	<i>Ehrlichia chaffeensis</i> , <i>Ehrlichia ewingii</i>	Human monocytic ehrlichiosis (HME)
	<i>Rickettsia rickettsii</i>	Rocky Mountain spotted fever
	<i>Francisella tularensis</i>	tularemia

Pronunciation Guide:

http://lymediseaseassociation.org/ledu/pron_guide.html

Tick-borne diseases



Babesiosis

Definition:

A human disease of the red blood cells caused by the protozoan *Babesia spp.* and transmitted by ticks.

Symptoms:

Fever, fatigue, jaundice and / or anemia.

Ehrlichiosis

Definition:

An infection transmitted by ticks that contain a parasitic *rickettsia*-type bacterium called *Ehrlichia*.

Symptoms:

Fever, flu-like symptoms, and malaise. If left untreated, ehrlichiosis can be fatal.

Anaplasmosis

Definition:

An infectious disease caused by a type of bacterium called *Anaplasma phagocytophilum*. It is transmitted to humans by blacklegged ticks.

Symptoms:

Fever, headache, muscle aches, chills and shaking, similar to the flu, can be fatal.

Pronunciation Guide:

http://lymediseaseassociation.org/ledu/pron_guide.html

Other tick-borne diseases



Tick-Borne Bartonella

Definition:

Produced by the bacteria *Bartonella henselae*, or other strains of *Bartonella*.

Symptoms:

May include visual problems, headache, significant enlargement of the lymph nodes, neurological deficits and new onset seizure disorder.

Rocky Mountain Spotted Fever

Definition:

Caused by a species of bacteria called *Rickettsia rickettsii*.

Symptoms:

Initial symptoms include a sudden onset of fever, muscle aches and headache, followed by development of a bright red spotted rash beginning on the hands and feet. The disease can be difficult to diagnose in the early stages, and without prompt and appropriate treatment, it can be fatal.

Tularemia

Definition:

An infectious disease caused by the bacterium *Francisella tularensis*, which can be transmitted to humans through the bite of various insects, and also ticks.

Symptoms:

In humans, the disease is characterized by intermittent fever and swelling of the lymph nodes. It is also called rabbit fever.

Pronunciation Guide:

http://lymediseaseassociation.org/ledu/pron_guide.html

Where can we get Lyme disease?



United States

The U.S. has more cases of Lyme disease than any other tick-borne or mosquito-borne illness.

In fact, all 50 states have reported cases of Lyme disease. Most cases occur in the Northeast, upper Midwest and California.

According to the CDC, ten times more cases of Lyme disease occur than are reported.

States with the Most Cases of Lyme Disease

State	No. of Cases
New York	4165
Pennsylvania	3994
New Jersey	3134
Connecticut	3058
Massachusetts	2988
Maryland	2576
Wisconsin	1814
Minnesota	1238
Virginia	959
New Hampshire	896

Table. Number of newly reported Lyme disease cases by state/area—United States, 2007. Courtesy of the Centers for Disease Control and Prevention.

Pronunciation Guide:

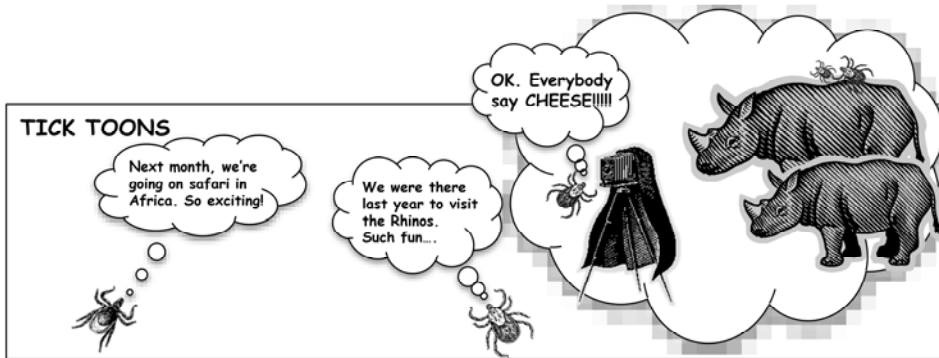
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Where can we get Lyme disease?



World

Lyme disease is found in the United States as well as in 65 countries worldwide.



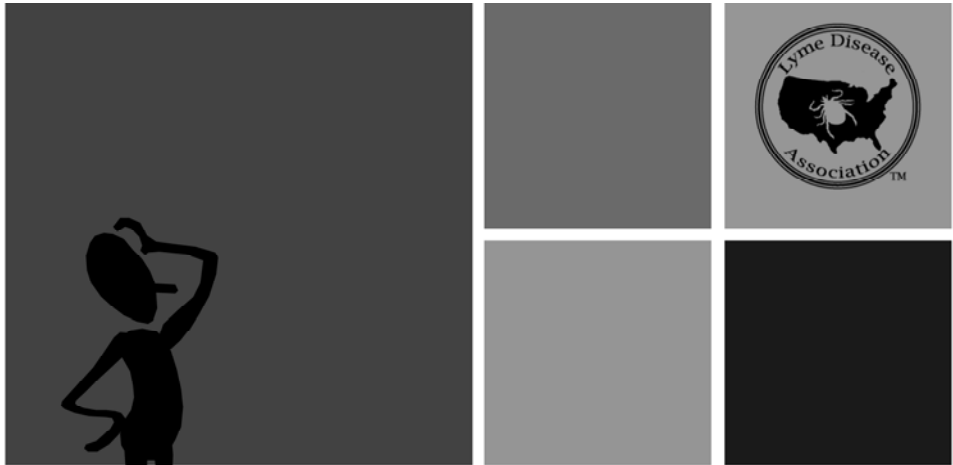
Pronunciation Guide:

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End of Module



**You have reached the end of
Module 1:
What is Lyme disease?**



Questions?


www.LymeDiseaseAssociation.org

If you have questions about any of the topics that we've discussed today, the LDA website,

www.LymeDiseaseAssociation.org,

offers lots of information so that you and your family can learn more!

In the meantime, be well and stay safe!

<p>THANKS!</p> <p>The Lyme Disease Association (LDA) thanks the following individuals for their help with various aspects of this project:</p>		

James Occi, MA, MS; Ray Stricker, MD; Pat Smith, BA, and D.L. Singfield of Lytaker. LDA especially thanks the Clear Run Intermediate School in Tobyhanna, Pennsylvania and teachers Joanne Bohrman and Marlena Middleton who initiated the LDA presentation to the 6th and 7th graders in February 2007, which precipitated development of this project.

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