



Tick-borne Diseases

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Commissioner
Ulster County Department of Health
and Mental Health

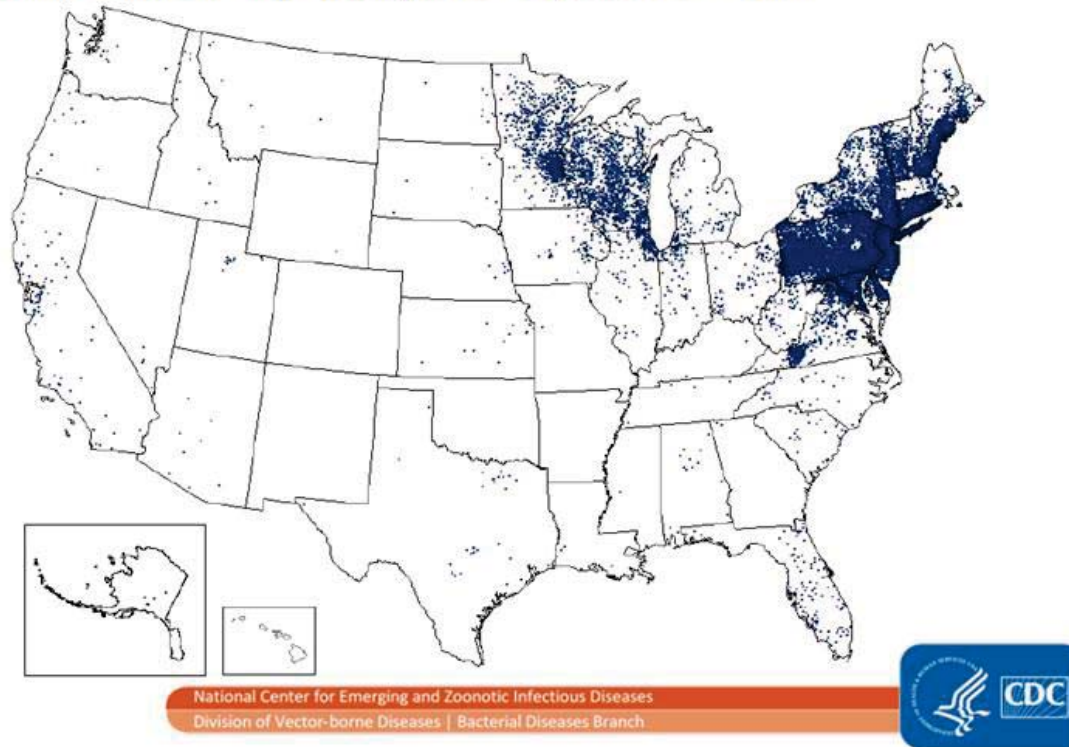


Overview

- ❖ Review of tick-borne diseases found in Ulster County and throughout New York State
- ❖ Prevention of tick-borne illness
- ❖ Diagnosis and treatment of tick-borne illness
- ❖ Conclusions

Reported Cases of Lyme Disease–United States, 2016

Each dot represents one case of Lyme disease and is placed randomly in the patient's county of residence. The presence of a dot in a state does not necessarily mean that Lyme disease was acquired in that state. People travel between states, and the place of residence is sometimes different from the place where the patient became infected.



Each year, approximately 30,000 cases of Lyme disease are reported to CDC by state health departments and the District of Columbia. Approximately 5,000 cases of Lyme disease occur in NY State each year.

Ticks Found in New York State



Black-legged ticks (*Ixodes scapularis*) can transmit several tick-borne diseases, such as anaplasmosis, babesiosis, and Lyme disease.



Lone star ticks (*Amblyomma americanum*) have been linked to ehrlichiosis and Southern Tick-Associated Rash Illness (STARI).



American dog tick (*Dermacentor variabilis*) can carry diseases such as Rocky Mountain spotted fever and tularemia.

Tick Research



Dr. Richard Falco



- **Fordham's Louis Calder Center State Entomology Lab**
- Calder Center monitors local populations of ticks and mosquitoes
- researches ways to detect and control the risks of diseases these insects carry
- collaborates with local departments of health in all nine counties of the NY Metro area with regard to such diseases
- responds to public outbreaks of vector-borne diseases such as the West Nile virus
- **NYSDOH Wadsworth Lab** performs testing to determine presence of tick-borne diseases in patients

Tick-borne Diseases in New York State

❖ Lyme Disease

❖ Anaplasmosis

❖ Babesiosis

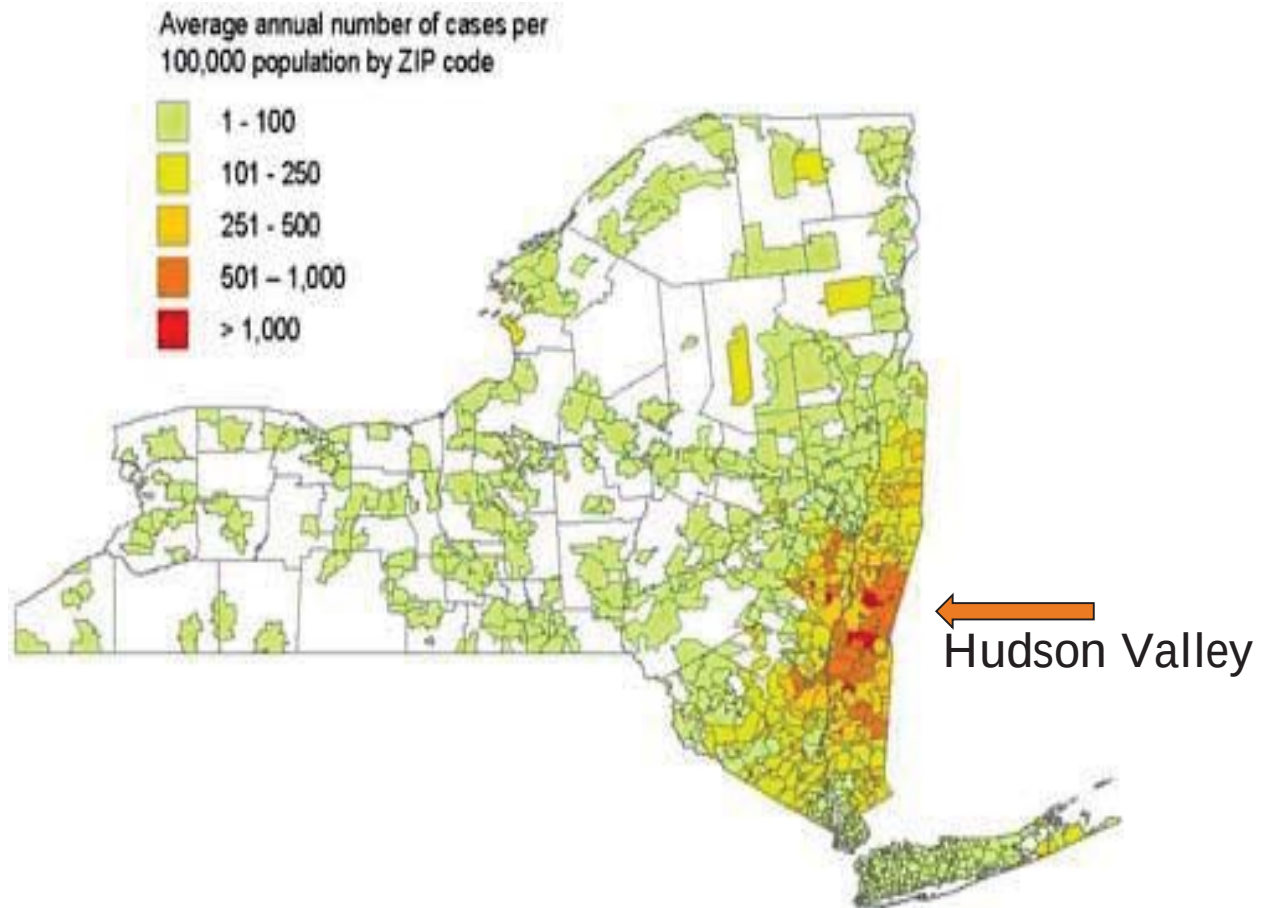
❖ Ehrlichiosis

❖ Rocky Mountain Spotted Fever

❖ Powassan Encephalitis



New York State Lyme Disease Incidence



Long Island and the Hudson Valley Region continue to show the most cases. No county is without some reported cases. (NY State DOH, Health Commerce System)

Tick-borne Diseases Reported in Ulster County 2015 - 2018

Disease	2015	2016	2017	2018	Average
Anaplasmosis	51	73	75		66
Babesiosis	17	16	26		20
Ehrlichiosis	4	3	9		6
Lyme	201 (514)*	138 (351)*	179 (419)*		177
Rocky Mountain Spotted Fever	0	0	3		3

*Estimated = (number of lab reported cases x 5) + cases reported directly by doctors + coinfecting cases)



Stages and relative sizes of three tick species. Only the blacklegged ticks are known to transmit Lyme disease

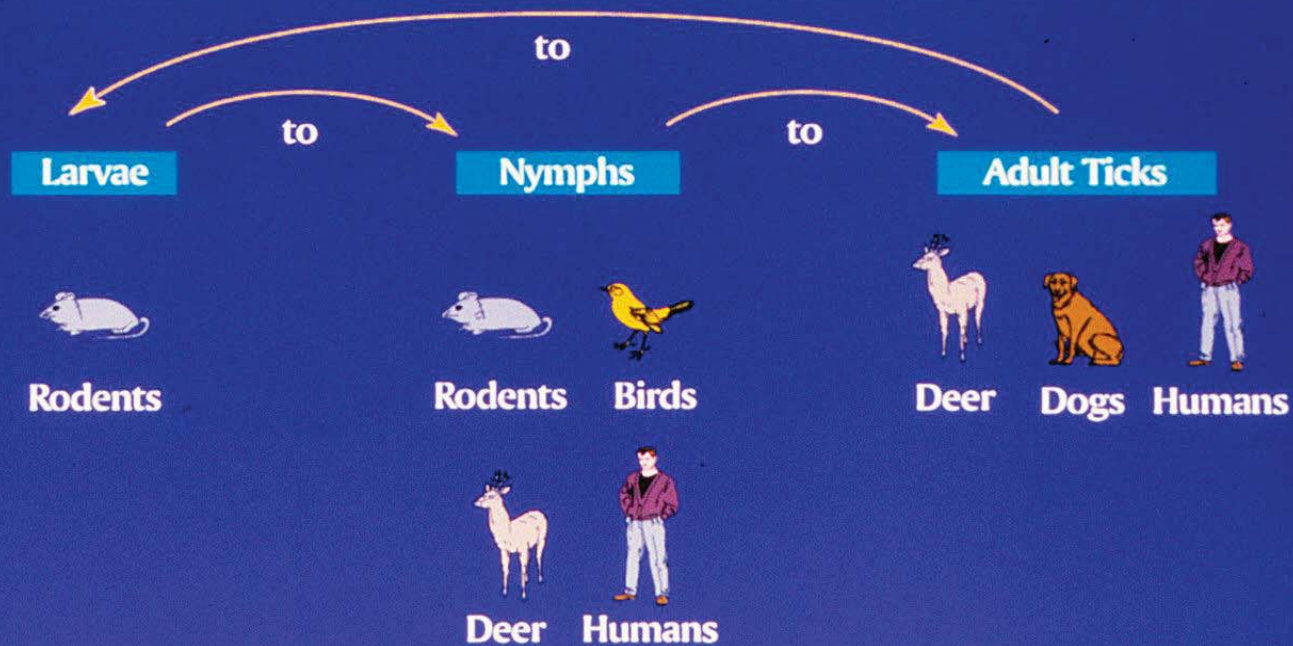


Source

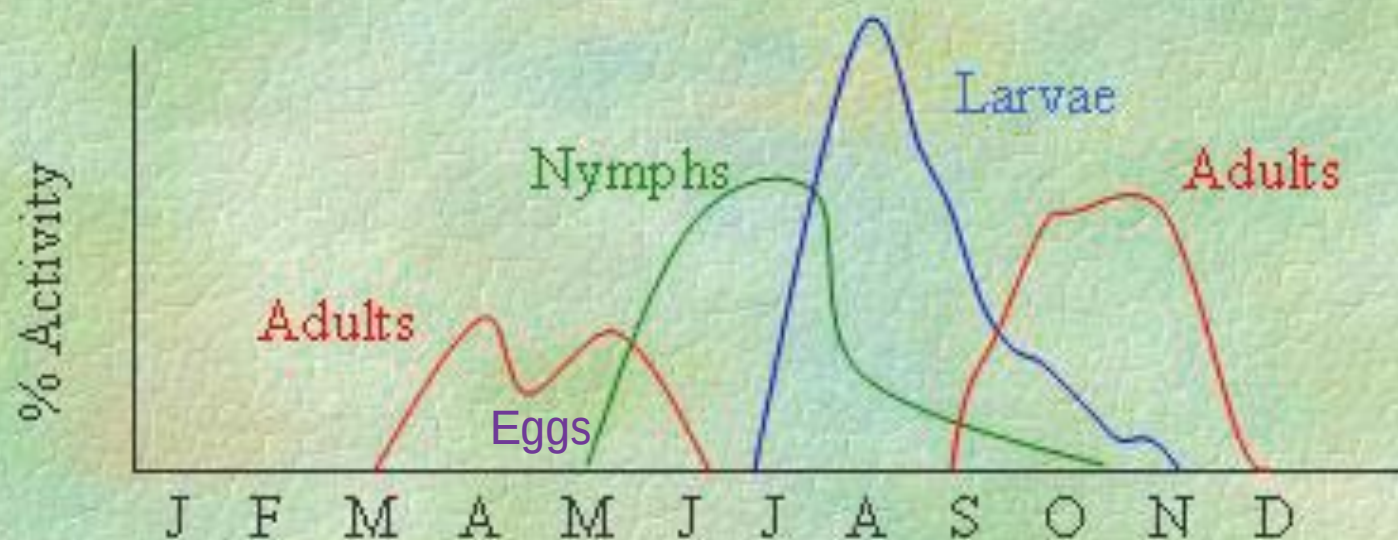


Ixodes scapularis Cycle

Tick Life Cycle



Season Activity of Deer Tick and Lifecycle



2 years long and 4 stages

- Eggs: Spring
- Larvae: Summer and Fall
- Nymphs: Summer
- Adults: Spring and Fall

Adapted from Falco 2002, *Grounds Maintenance*

Tick Host-Seeking Behavior

- ❖ Ticks perch on top of low vegetation
- ❖ Ticks are attracted by carbon dioxide emissions and heat
- ❖ Ticks extend their front legs to climb on a passing host



Disease Transmission



Mouthparts of tick
(barbed hypostome)



Transmission of Lyme Disease

- ❖ Not all ticks are infected with the bacteria that causes Lyme or other diseases
- ❖ Ticks acquire the bacteria by feeding on an infected animal & may spread the infection to other animals and humans in subsequent feedings



Reservoir species:
field mouse with ticks
on ears

How do I prevent tick-borne disease?

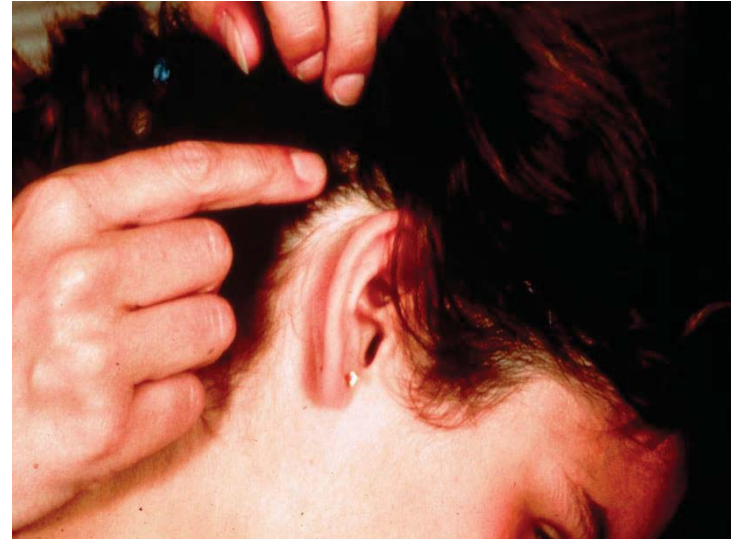
- Stay on trails and in open areas
- Perform tick checks every few hours when outdoors
- Wear light-colored clothing
- Tuck in clothes
- Brush off clothing before entering home
- Use tick repellants
- Check pets
- Make tick checks part of your daily routine

Shower off when home!!



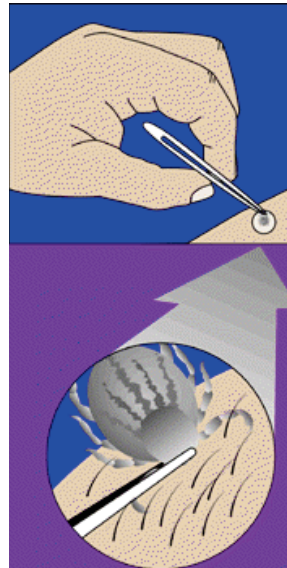
Personal Protection

- ❖ Prompt removal of attached ticks
- ❖ Transmission of bacteria is unlikely if tick is attached for less than 36 hours.
- ❖ Lyme vaccine is no longer available



Proper Tick Removal

- Use fine point tweezers
- Grab tick at mouth (not body)
- Pull gently straight out. Do not twist or squeeze tick
- Disinfect area and tweezers
- Option of bringing tick to UCDOH for identification
- Monitor for symptoms



DO NOT USE:

- Vaseline
- Lit cigarette
- Kerosene
- Other home remedies

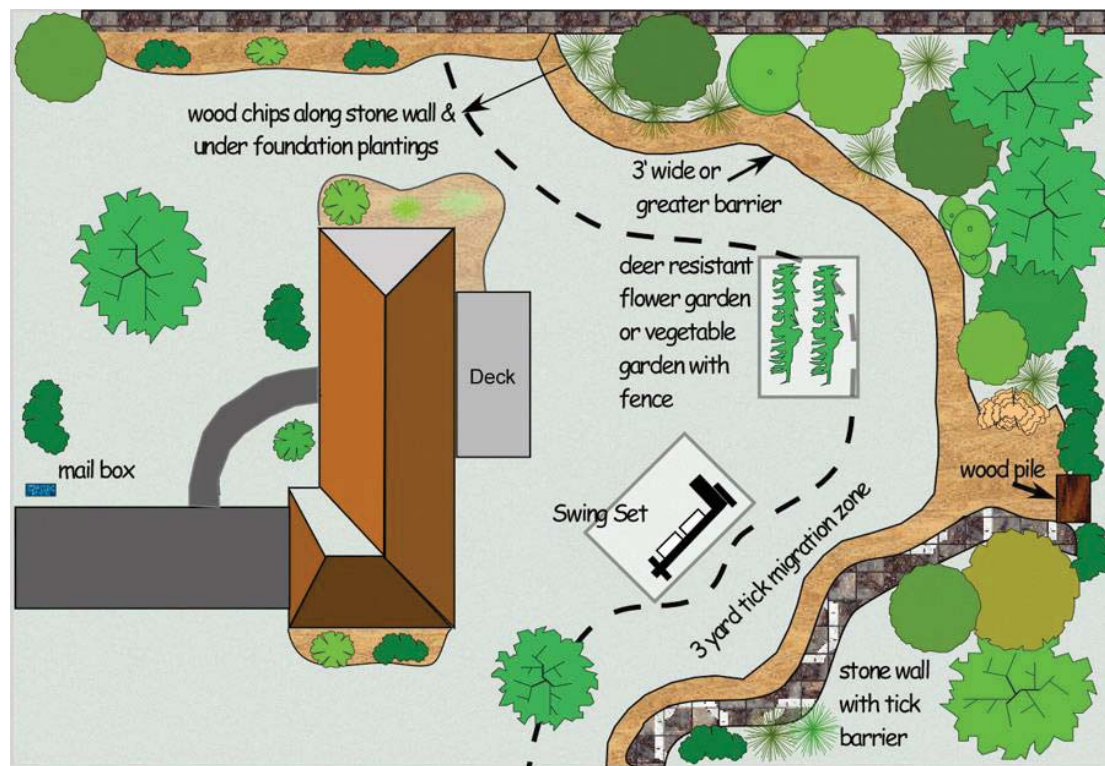


Tick Removal Kit

Environmental Controls

Cut back tick habitats

- Mow lawns regularly
- Remove leaf piles
- Trim shrubbery
- Prune trees to allow more light
- Keep Clothes lines out of the woods
- Install deer fences



WARNING

Ticks Found in this Area MAY Cause

LYME DISEASE & Other Tick-borne Diseases

To avoid tick bites:

- Consider using insect repellents; follow label directions.
- Walk in the center of trails, avoid high grass and brush at trail edges.
- Check for ticks daily on yourself, your children and your pets.
- Carefully remove attached ticks, fine point tweezers work best.
- Shower soon after being outdoors.



New York State Department of Health
www.health.ny.gov

WARNING

Ticks Found in this Area **MAY** Cause Diseases



PREVENT LYME DISEASE

Tuck pants in socks and wear light colored clothing

Increase protection by wearing repellent

Check for ticks and remove them immediately

Know if you've been bitten– call your physician



For further information call the
Ulster County Department of Health
845-334-5527
www.healthylulstercounty.net



Free Publication distributed to Outdoor workers

protect yourself from tick-borne diseases

Ticks can be found in most of the United States, and may carry serious diseases. Some of the diseases that you can get from a tick bite include:

- Anaplasmosis
- Babesiosis
- Colorado tick fever
- Ehrlichiosis
- Lyme disease
- Powassan encephalitis
- Q fever
- Rocky Mountain spotted fever
- Southern tick-associated rash illness (STARI)
- Tick-borne relapsing fever
- Tularemia

Lyme disease is the most frequently reported tick-borne illness in the United States. People become infected with Lyme disease through the bite of a black-legged tick (*Ixodes scapularis* or *pacificus*) that is infected with the bacterium *Borrelia burgdorferi*.



Recognize the Ticks!

Some ticks can transmit more than one pathogen. The pictures below show three of the common adult ticks found in the United States. Younger ticks that are smaller and less distinctive may also transmit disease.



Black-legged ticks (*Ixodes scapularis*) can transmit several tick-borne diseases, such as anaplasmosis, babesiosis, and Lyme disease.



Lone star ticks (*Amblyomma americanum*) have been linked to ehrlichiosis and Southern Tick-Associated Rash Illness (STARI).



American dog tick (*Dermacentor variabilis*) can carry diseases such as Rocky Mountain spotted fever and tularemia.

Recognize the Symptoms!

People of all ages can be infected. There is no vaccine currently available to prevent Lyme disease or most other tick-borne diseases, so early detection and treatment are important. Most tick-borne diseases can be treated successfully. Early detection and treatment can prevent more serious illness.

Early symptoms of tick-borne diseases may include:

- Fever
- Headache
- Fatigue
- Rash

See a health care provider if you develop these symptoms after a tick bite.

For more information: <http://www.cdc.gov/lyme>
or call: 1-800-311-3435



take these steps to reduce your risk...

Avoid Tick Bites!

1. Avoid Areas with Lots of Ticks.

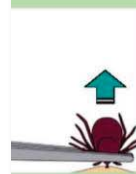
- Avoid wooded and bushy areas with high grass and leaf litter.
- Take extra precautions late spring through early fall when ticks that transmit disease are active.
- Walk in the center of the trail when in the woods or high grass.
- Ask your local health department and park or extension service about tick infested areas to avoid.

Keep Ticks off Your Skin.

- Apply insect repellent with 20% DEET or more on skin and clothing when you go outdoors (for kids too!). Don't spray repellent on skin under clothing.
- Permethrin sprayed on clothing **kills ticks on contact** and provides protection through several washings. Don't use permethrin on skin.
- Cover up! Wear long pants, long sleeves, and long socks. Light-colored clothing will help you spot ticks more easily. Tucking pant legs into socks or boots and tucking shirts into pants help keep ticks on the outside of clothing.

2. Perform Tick Checks!

- **Remove ticks from your clothes** before going indoors. Wash your clothes with hot water and dry them using high heat for at least one hour.
- **Check your body and your child's body for ticks** after being outdoors, even in your own yard. Use a mirror to view all parts of your body (in armpits, behind ears, in groin, etc.) and remove



Safely remove ticks. Early tick removal may reduce the risk of infection of some tick-borne diseases. Follow the steps below to safely remove ticks from animals and humans. Use fine-tipped tweezers and protect bare hands with a tissue or gloves to avoid contact with tick fluids.

Grasp the tick close to the skin. Do not twist or pull the tick, as this may cause the mouthparts to break off and remain in the skin.

Hold the tick up until all parts of the tick are removed. Once removed, wash your hands with soap and water or use hand rub. Clean the tick bite with an antiseptic such as iodine scrub, rubbing alcohol, or soap and water.

3. Contact your healthcare provider if you develop fever, headache, fatigue, or rash.

- **Use tick medicine or collars on dogs and cats. Check pets regularly for ticks.**

3. Control Ticks around Your Home and in Your Community

- Create Tick-Safe Zones. **Many infections happen in your own yard!** Remove leaf litter and brush around your home and at the edges of lawns. Place wood chips or gravel between lawns and wooded areas. Mow the lawn and clear brush regularly. Keep playground equipment, decks and patios away from yard edges and trees.

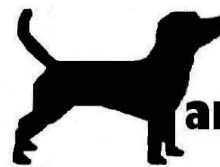


- Apply pesticide to control ticks. A single application to your lawn at the end of May or beginning of June can reduce *Ixodes* tick populations by 68-100%.

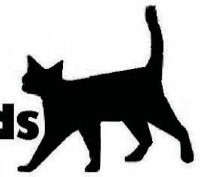
K. Stafford,
CT Agricultural
Experiment Station
New Haven

Pet Owner and Pet Associated Businesses Handout

Ulster County Department of Health



Lyme Disease and Your Furry Friends



Lyme Disease isn't limited to humans. Your furry friend is at just as great of a risk for contracting the tick-borne disease. As it heads into prime tick season, it is important to take preventive measures.

Tick Bite Prevention:

Keep away from grassy or wooded areas when walking or exercising your pet outdoors.

Check your pet regularly for ticks, especially after outdoor trips.

Remove tick promptly if you do find one.

Discuss an insecticidal bath with your veterinarian or groomer if you find several ticks on your dog.

Consult your veterinarian about treating your dog or cat with tick-killing pesticides (acaricides) or using tick collars. There are many pesticides aimed at preventing tick bites, but some people and animals may be sensitive to the chemicals they contain.

Consult your veterinarian about the vaccine (Lyme disease vaccine) available for dogs.



Removing a Tick:

1. Avoid folklore remedies such as "painting" the tick with nail polish or petroleum jelly, or using heat to make the tick detach from the skin. Your goal is to remove the tick as quickly as possible -not waiting for it to detach.

2. Use fine-tipped tweezers to grasp the tick as close to the skin's surface as possible.

3. Pull upward with steady, even pressure. Don't twist or jerk the tick; this can cause the mouth-parts to break off and remain in the skin. If this happens, remove the mouth-parts with tweezers. If you are unable to remove the mouth easily with clean tweezers, leave it alone and let the skin heal.

4. Disinfect site and tweezers with rubbing alcohol, then wash your hands with soap and water after removing the tick.

Symptoms of Lyme Disease in Pets:

Lyme disease in animals has similar symptoms as to those of Lyme disease in humans. Although you will not see a skin rash on your pet, they can experience a range of symptoms.

In dogs: Some infected dogs do not experience any symptoms of Lyme disease. Symptoms include lethargy, arthritis (displayed as joint pain, shifting from foot to foot, and lameness), fever, fatigue, and kidney damage. Symptoms can become chronic.



In cats: Though there is some debate about whether cats suffer from Lyme disease, cats are thought to be highly resistant to the disease.

Treatment of Lyme Disease in Pets:

You should consult your veterinarian about proper treatment for your pet.

Important Considerations:

Pet owners are at an increased risk for tick encounters, especially those who have animals that are permitted to go in and out of the home. Ticks that have not embedded in the animal may drop off in the home and will continue to seek a blood meal. For this reason, it is not advisable to let pets sleep in the same bed with family members.

For More Information Please Contact:

Ulster County Department of Health
(845) 334-5527

For more information on Lyme disease in humans visit:
<http://www.health.ny.gov/diseases/communicable/lyme/>



Diagnosis and Treatment



What to do if you suspect Lyme Disease?

- Keep a diary of your symptoms
- Immediately see a physician
- Diagnosis is based on clinical symptoms and laboratory tests
- Antibiotics cure most cases of Lyme

Symptoms of Lyme disease

- Erythema Migrans (EM) or Bulls-eye rash (expanding rash)
- Typically lasts 7 to 14 days
- Not found in all cases
- Not to be confused with reaction to bite (seen below)





Other Lyme Disease Symptoms

Localized	Disseminated	Late stage
-EM -Fatigue -Flu-like symptoms -Muscle, joint aches -Regional lymphadenopathy (Lymph nodes that are abnormal in size, consistency or number) 	-Bell's palsy -Migratory pain in joints/muscles -Atrioventricular block -Malaise -Generalized lymphadenopathy 	-Chronic or prolonged arthritis -Neurological problems -Fatigue -Heart problems 

Lab Tests for Lyme Disease

Indirect test (2 Tier)

Measures antibody to *B. burgdorferi*

➤ *Tier 1: Elisa or IFA*

➤ *Tier 2 : Western Blot* (detects IgM and IgG Ab's)

❖ Positive IgM = 2 of 3 bands + (recent infection)

❖ Positive IgG = 5 of 10 bands + (past infection)

- <50% of patients with ECM will test positive
- Tests most helpful for Stage 2 and 3 Lyme

Antibiotic Treatment for Lyme Disease

Preferred oral regimen

Amoxicillin, 500 mg every 8 hours × 21 days or

Doxycycline, 100 mg every 12 hours × 21 days

Alternative oral regimen

Cefuroxime, 500 mg every 12 hours × 21 days or

Erythromycin, 250 mg every 6 hours × 21 days or

Clarithromycin, 500 mg every 12 hours × 21 days

Preferred parenteral regimen

Ceftriaxone, 2g IV daily x 14 days

Alternative parenteral regimen

Cefotaxime, 2g IV every 8 hours x 14 days or

Penicillin G, 3–4 million units IV every 4 hours × 14 days

Other Tick-borne Diseases

Anaplasmosis

(Formally known as Human Granulocytic Ehrlichiosis)

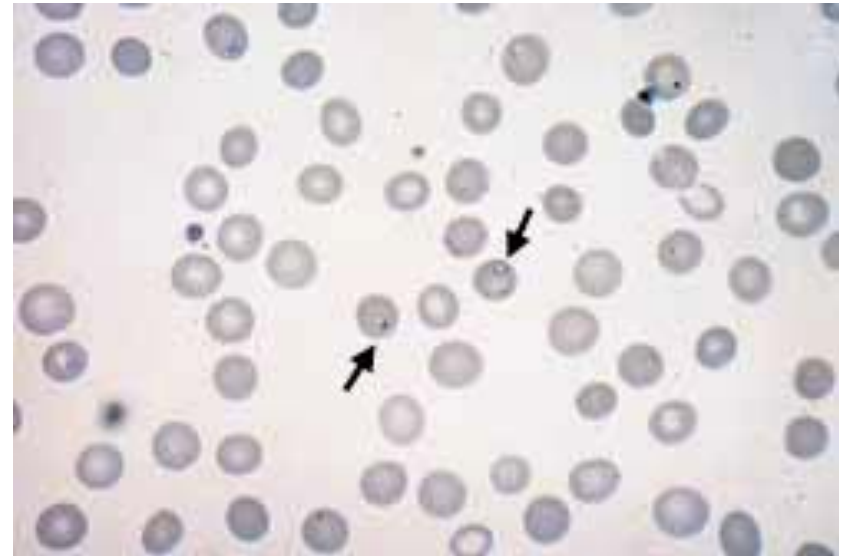
- Transmitted by Deer Tick
- 7-21 day incubation
- Fever, muscle ache, weakness, headache, nausea, no rash
- Clinical and lab diagnosis
- Treat with tetracycline
- Can be fatal



Other Tick-borne Diseases

Babesiosis

- Transmitted by Deer tick
- Incubation 1-8 weeks, may be longer
- Fever, chills, fatigue, anemia
- Red-blood cell parasite
- Diagnose ring in red blood cell
- Clindamycin and quinine/Atovaquone and azithromycin
- Exchange transfusion may be necessary
- Can be fatal



Red Blood Cells with infection.
Arrows denote rings.

Other Tick-borne Diseases

Ehrlichiosis (HME)

- Transmitted by the Lone Star tick
- 7-21 day incubation
- Fever, muscle ache, weakness, headache, nausea, disorientation, rash not common
- Clinical and Lab diagnosis
- Treat with Tetracycline
- Can be fatal



Female Lone Star Tick

Other Tick-borne Diseases

Rocky Mountain Spotted Fever

- Spread by dog tick
- 3-14 day incubation
- Sudden fever
- Severe headache
- Deep muscle pain
- Rash on hands and feet that progresses to the trunk
- Treat with Tetracyclines, Chloramphenicol
- Can be fatal



Early rash (on foot)



Late rash

Other Vector Borne Diseases

Powassan Encephalitis

Powassan Virus (flavivirus)

- Larvae, nymphs, adults feed on a variety of hosts including skunks, raccoons, squirrels, fox, weasels, woodchucks
- Incubation period 1 to 4 weeks
- Mild Symptoms: fever, headache, body aches or
- Severe Symptoms: high fever, headache, disorientation, convulsions, paralysis, coma, death
- 0 – 3 cases per year in NY State
- No specific treatment
- 10 – 15% fatality rate



Mosquito



Wood Chuck Tick



Deer Tick

Conclusions

- ❖ Tick-borne diseases are a significant problem for our region
- ❖ Ticks may transmit several different diseases
- ❖ Medical providers need to maintain a high index of suspicion for the presence of tick-borne illness in sick patients
- ❖ Ongoing surveillance and research is needed to better understand these diseases and their treatment
- ❖ Education on disease prevention remains the most cost-effective way to manage tick-transmitted disease



Health Department



Tick Identification

340-3010

Environmental Health Division/
Health Education Division

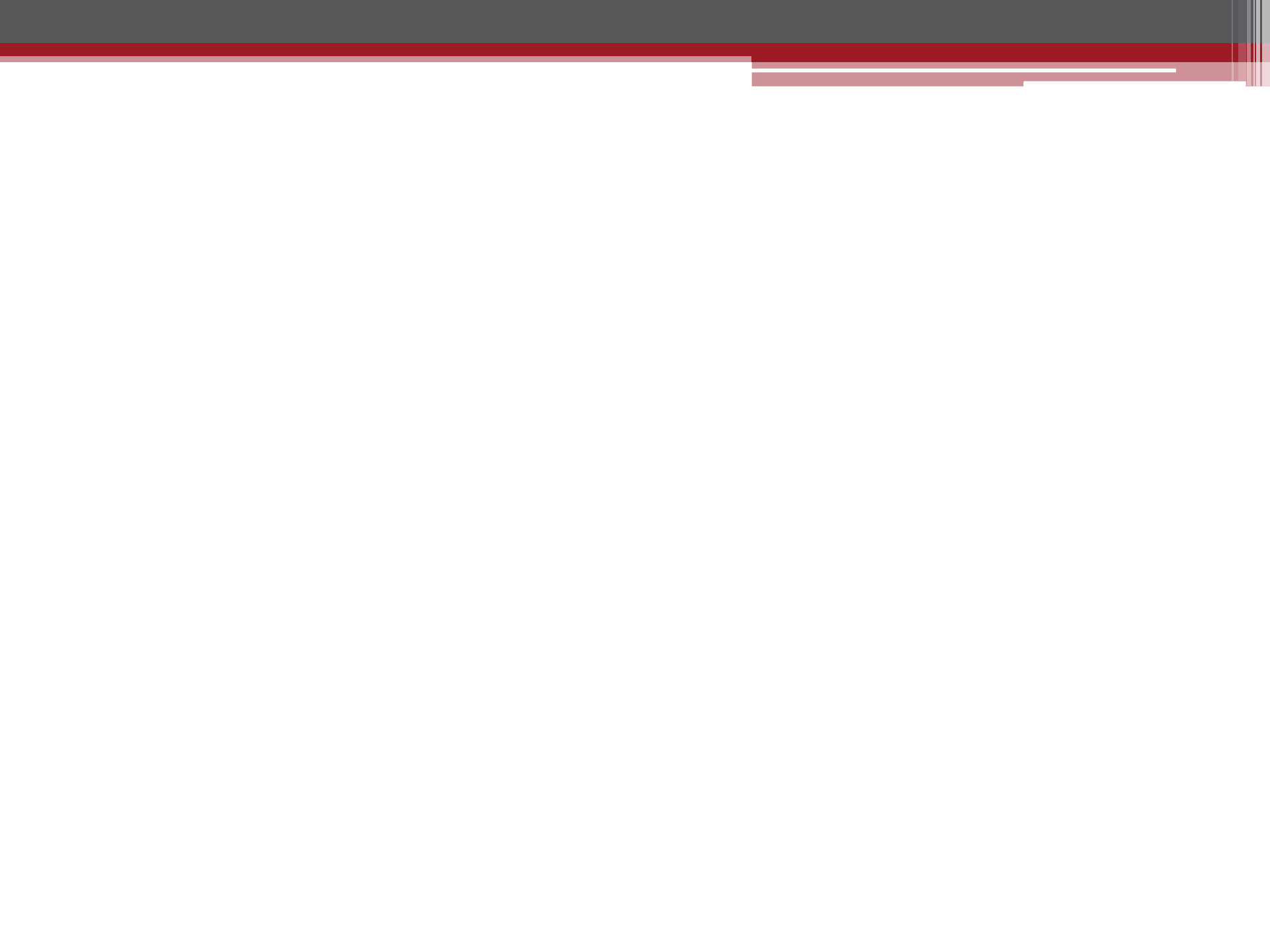
239 Golden Hill Lane
Kingston, NY 12401



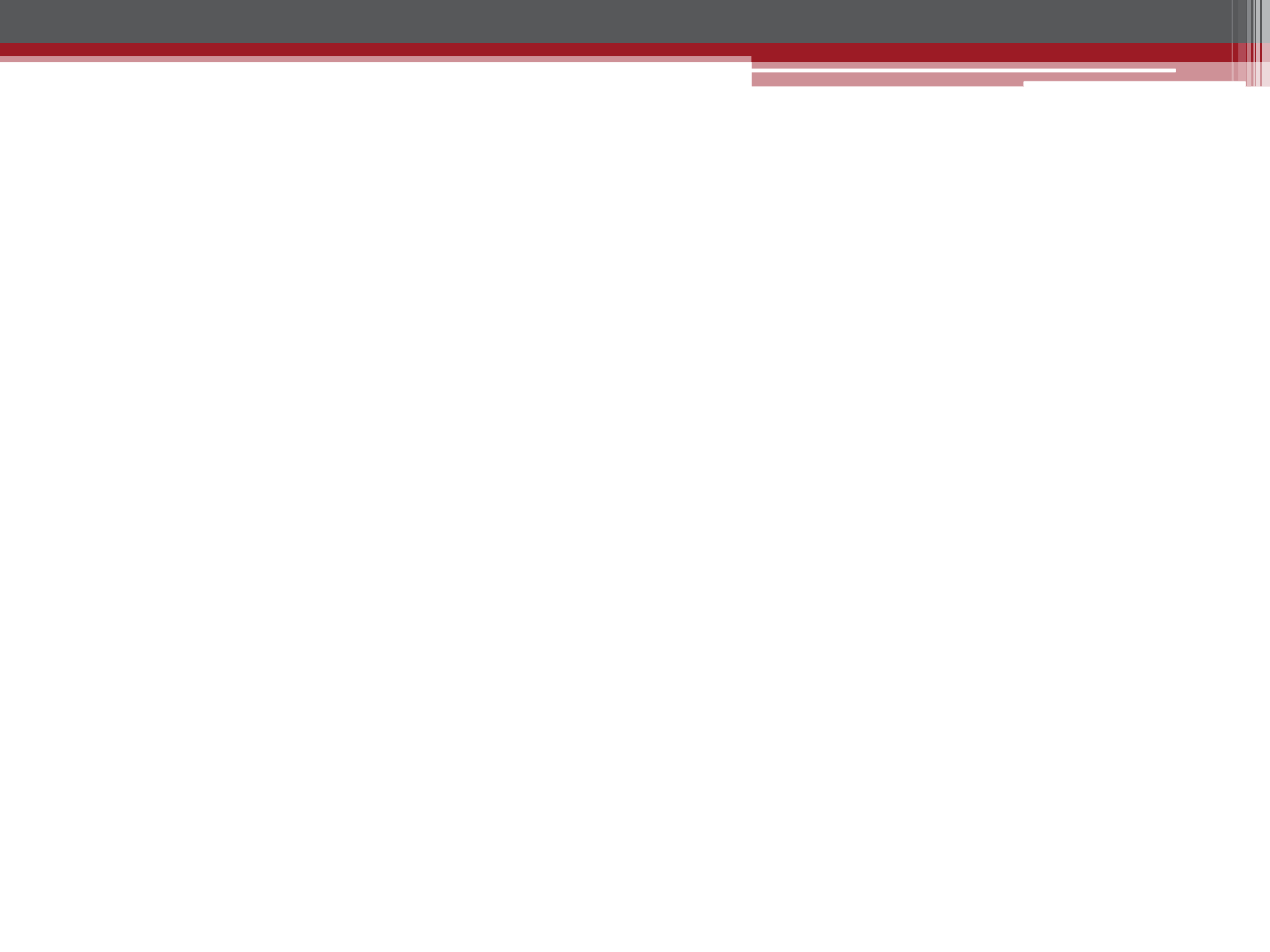
BE **tick** **FREE**



Thank You



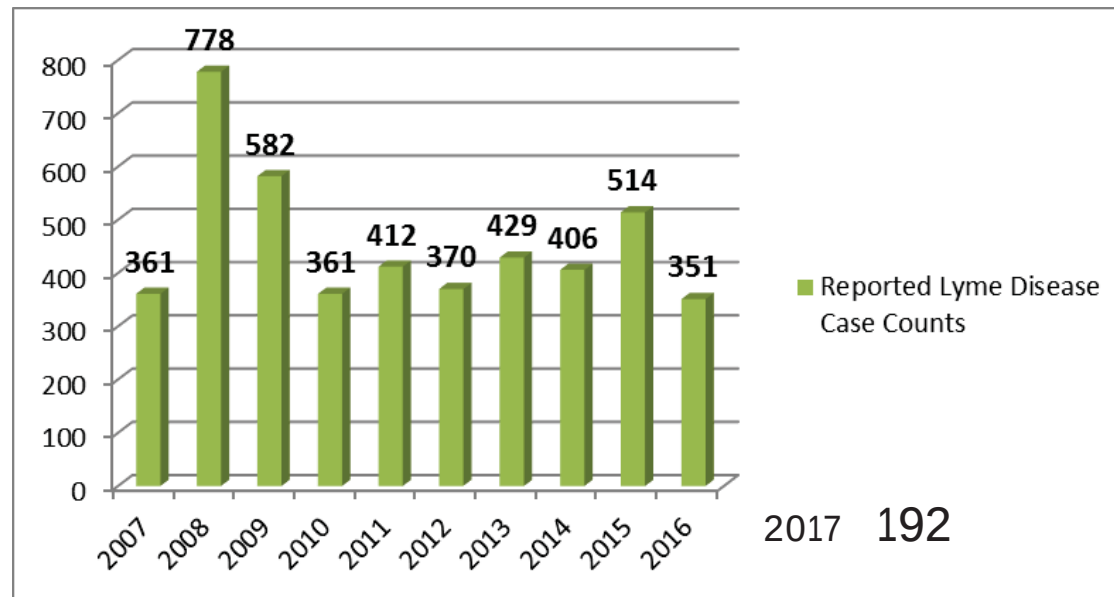
<https://youtu.be/Ch7ftqcZoG4>



Cases of Tick-borne Diseases in New York State

Disease	2012	2011	2010	2009	Av. 2009-2012
Lyme	1879	2689	2073	3162	2641
Anaplasmosis	225	185	144	170	166
Babesiosis	90	279	191	157	209
Ehrlichiosis	16	36	24	42	34
Rocky Mountain Spotted Fever	17	7	14	12	11
Arboviral Encephalitis	17	9	23	7	13

Reported Lyme Disease Case Counts for Ulster County 2007 - 2017



Reported Cases of Lyme Disease -- United States, 2011



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

2007	2008	2009	2010	2011
27,444	28,921	29,959	22,561	24,364

Federal Legislative Hearings

Sen. Richard Blumenthal (D. Conn.) Chairs Senate Hearing In State On Lyme Disease Prevention, Hears From Senate Colleague, Patients And Experts

Thursday, August 30, 2012

112TH CONGRESS 1ST SESSION S. 1381

To provide for the expansion of Federal efforts concerning the prevention, education, treatment, and research activities related to Lyme and other tick-borne diseases, including the establishment of a Tick-Borne Diseases Advisory Committee.

Hearings and Actions

Oversight Hearing

Global Challenges in Diagnosing and
Managing Lyme Disease—Closing Knowledge
Gaps



Tick Habitats



Ulster County Legislature Resolution No. 55

March 20, 2012

Establishing An Ulster County Lyme Disease Advisory Committee

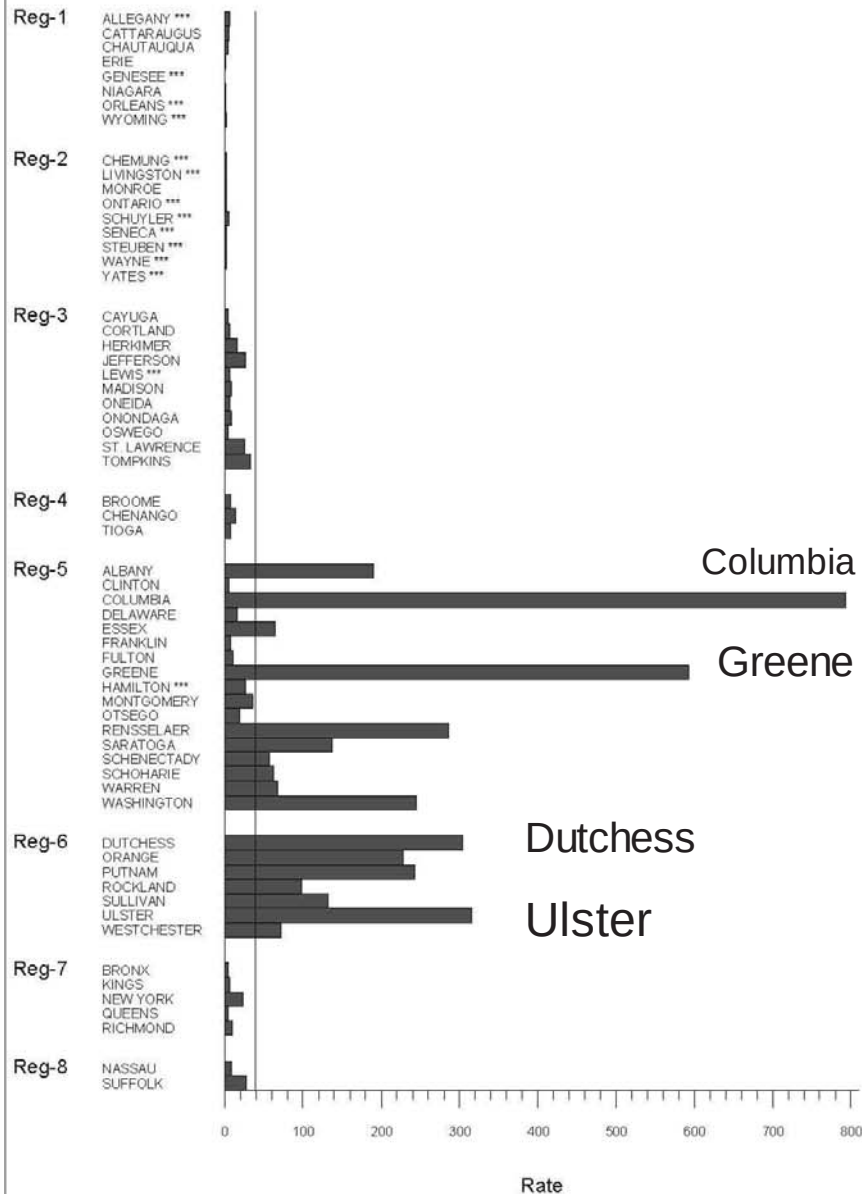


- Created to study the spread of Lyme disease
- Committee reviewed current public health policies and activities related to Lyme disease.
- Committee submitted a written report of its findings and recommendations to the County Legislature, County Executive and Commissioner of the Department of Health on September 20, 2012.



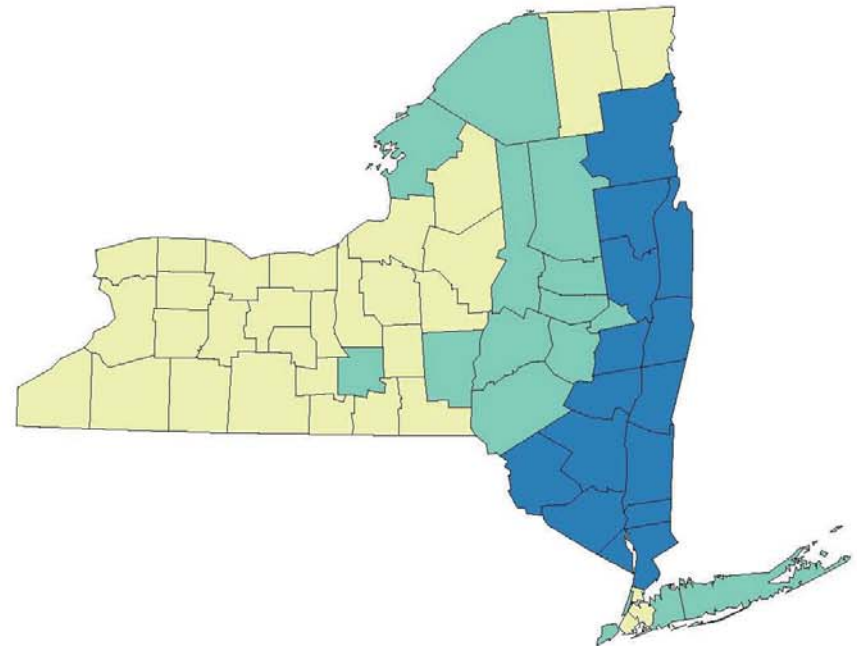
"You have Lyme's Disease. Do you spend any time in areas where there are a lot of deer?"

New York State: 39.4

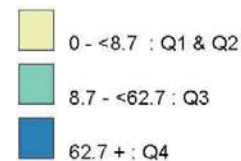


*** Indicates Rate Is Based On Fewer Than 10 Cases

Lyme Disease Per 100,000 Population
2007-2009



Rate
Counties Are Shaded Based On Quartile Distribution



Source: Bureau of Communicable Disease Control