Tick-borne Diseases

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and

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March 15, 2018

Michael P. Hein
Ulster County Executive
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
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

- **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

Dr. Richard Falco
Tick-borne Diseases in New York State

- Lyme Disease
- Anaplasmosis
- Babesiosis
- Ehrlichiosis
- Rocky Mountain Spotted Fever
- Powassan Encephalitis (not reported in Ulster County)
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 - 2017

<table>
<thead>
<tr>
<th>Disease</th>
<th>2017</th>
<th>2016</th>
<th>2015</th>
<th>Average</th>
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<tbody>
<tr>
<td>Anaplasmosis</td>
<td>75</td>
<td>73</td>
<td>51</td>
<td>66</td>
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<tr>
<td>Babesiosis</td>
<td>26</td>
<td>16</td>
<td>17</td>
<td>20</td>
</tr>
<tr>
<td>Ehrlichiosis</td>
<td>9</td>
<td>3</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Lyme</td>
<td>192</td>
<td>138 (351*)</td>
<td>201 (514*)</td>
<td>177</td>
</tr>
<tr>
<td>Rocky Mountain Spotted Fever</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

*Estimated = (number of lab reported cases x 5) + cases reported directly by doctors + coinfected cases*
Stages and relative sizes of three tick species. Only the blacklegged ticks are known to transmit Lyme disease.

Source: CDC
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 then 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 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
845-334-6557
www.healthyulstercounty.net

Michael P. Hess
Ulster County Executive
**Minimize tick bites**
1. Avoid areas with lots of ticks.
   - Keep alert for ticks when you are outdoors. Ticks are active during early fall.
   - Cover up from dawn to dusk and use long sleeves when outdoors.
   - Apply insect repellent with at least 20% DEET.
2. Use proper clothing.
   - Wear light-colored clothing.
   - Use insect repellent on your skin and clothing.
   - Cover the skin with long sleeves or pants.
3. Remove ticks from your clothing.
   - Use a tickpick or a needle to remove ticks.
4. Check your body and your child's body for ticks.
   - Check your skin after returning indoors or outdoors.
5. Contact your healthcare provider if you develop fever, headache, fatigue, or rash.
   - Use ticks prevention creams on dogs and cats. Cats get regularly for ticks.

**Recognize the threat!**
- Some ticks can transmit more than one disease. The picture below shows the common adult ticks found in the United States. Ticks are not visible when they are still onyou.

**Recognize the symptoms!**
- People of all ages can be infected. There is no vaccine currently available to prevent Lyme disease, but other tick-borne diseases, such as tularemia, Rocky Mountain spotted fever, and ehrlichiosis, can be prevented.
- Early symptoms of tick-borne diseases may include:
  - Fever
  - Headache
  - Fatigue
  - Rash
See a healthcare provider if you develop these symptoms after a tick bite.

For more information: [http://www.cdc.gov/lyme](http://www.cdc.gov/lyme) or call: 1-888-315-4747

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**Tick Sells Zones**
- Avoid tick-free zones. Keep tick-free zones non-forested.
- Remove leaf litter and brush around your yard and the edges of your home.
- Use insect repellent with at least 20% DEET.
- Keep your yard free of trail, mowing, and weeding.
- Keep your yard clean and brush regularly.
- Keep playground equipment, decks, and patios away from your yard.
- Keep your pets clean and healthy.

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**Prevent Tick bites**
- Avoid wooded and brushy areas with high grass and leaf litter.
- Keep your yard free of trail, mowing, and weeding.
- Use insect repellent with at least 20% DEET.
- Keep your yard clean and brush regularly.
- Keep playground equipment, decks, and patios away from your yard.
- Keep your pets clean and healthy.
- Keep your yard free of trail, mowing, and weeding.
- Use insect repellent with at least 20% DEET.
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 ticks 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 parasitic worms in the same family, but some people and animals may be sensitive to these chemicals.
- 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 and without 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 mouthparts to break off and remain in the skin. If this happens, remove the mouthparts with tweezers. If you are unable to remove the mouthparts with clamps 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 (swollen joints), 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 exposure, especially those who live near areas that are permitted to go into the woods and enjoy outdoor activities. 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 play in the same bed with family members.

**For More Information Please Contact:**

Ulster County Department of Health
(BUS) 344-5577

For more information on Lyme disease in humans visit:

http://www.health.ny.gov/diseases/communicable/lyme/
Tick Identification

340-3010
Environmental Health Division/
Health Education Division
239 Golden Hill Lane
Kingston, NY 12401
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
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

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

![Image of a person with symptoms]

![Image of joint inflammation]
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
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
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
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
Thank You
https://youtu.be/Ch7ftqcZoG4
## Cases of Tick-borne Diseases in New York State

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<thead>
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<tbody>
<tr>
<td>Lyme</td>
<td>1879</td>
<td>2689</td>
<td>2073</td>
<td>3162</td>
<td>2641</td>
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<tr>
<td>Anaplasmosis</td>
<td>225</td>
<td>185</td>
<td>144</td>
<td>170</td>
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<tr>
<td>Babesiosis</td>
<td>90</td>
<td>279</td>
<td>191</td>
<td>157</td>
<td>209</td>
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<tr>
<td>Ehrlichiosis</td>
<td>16</td>
<td>36</td>
<td>24</td>
<td>42</td>
<td>34</td>
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<tr>
<td>Rocky Mountain Spotted Fever</td>
<td>17</td>
<td>7</td>
<td>14</td>
<td>12</td>
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<tr>
<td>Arboviral Encephalitis</td>
<td>17</td>
<td>9</td>
<td>23</td>
<td>7</td>
<td>13</td>
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</table>
Reported Lyme Disease Case Counts for Ulster County 2007 - 2017

![Graph showing Lyme disease case counts from 2007 to 2017. The highest count was 778 in 2008, and the lowest was 351 in 2016. The year 2017 shows 192 cases.]
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?”