What You Should Know About Lyme Disease and Other Tick-Borne Diseases

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Goal

“Minnesota residents and visitors will take action to prevent exposure to ticks which may carry *Borrelia burgdorferi*; will know the signs and symptoms of Lyme disease and other tick-borne diseases; and if present, will seek early diagnosis and treatment.”

1995 Minnesota Lyme Disease Public Education Plan
Goals of presentation

• Be aware of Lyme disease and other tick-borne diseases
• Recognize basic signs and symptoms
• Seek early diagnosis and treatment
• Know whether you live, work or play in endemic areas
• Practice prevention activities
• Know whom to contact for more information
LYME DISEASE

*Borrelia burgdorferi*,
the bacteria that cause Lyme disease
History

1975  Juvenile cases of arthritis found in Connecticut

Disease named Lyme disease

1985  Lyme disease became reportable in Minnesota
Lyme Disease
Signs & Symptoms

3 to 30 days after deer tick bite

- Rash (often “bulls-eye”)
- Fever
- Chills
- Headache
- Muscle and joint pain
- Fatigue
Erythema migrans (EM) rash characteristic of Lyme disease
Lyme disease rash without central clearing
Lyme Disease
Signs & Symptoms

Days to weeks after illness onset
• Multiple rashes
• Facial paralysis on one side
• Fever, stiff neck, headache
• Weakness, numbness, arm/leg pain
• Irregular heart beat
• Persistent weakness and fatigue
Multiple Rashes

- Reaction as bacteria move through body
- Not caused by multiple tick bites
Multiple Rashes

- This is another example of a multiple rash.
Lyme Disease
Signs & Symptoms

Weeks to months after illness onset

• Fatigue
• Chronic arthritis
• Nervous system problems
Joint Swelling

Joint swelling and pain may occur weeks to months after onset of illness if left untreated.
Diagnosis of Lyme Disease

- Physical examination
- History of possible exposure to deer ticks
- Blood tests may be performed
  - A screening test is done first, followed by a confirmatory test for antibodies to Lyme disease bacteria
Remember

Early recognition of signs and symptoms of Lyme disease is very important for prompt diagnosis and treatment.
Treatment

• Lyme disease can be treated
• Antibiotics are used to treat Lyme disease
• Talk to your doctor about specific treatment
Questions about Diagnosis or Treatment of Lyme Disease?

Call your doctor

or

Minnesota Department of Health at 651-201-5414
TICKS

Blacklegged Tick
(deer tick)
(spreads Lyme disease)

American dog tick
(wood tick)
(does not spread Lyme disease)
Blacklegged Ticks (Deer Ticks)

Blacklegged ticks have three life stages:

- **Larva**
- **Nymph**
- **Adult (female)**
Blacklegged Tick Larvae

• Size of period at end of sentence

• Initially does not have Lyme disease bacteria, so does not transmit the bacteria to a host

• May get the bacteria from a host who has the bacteria
Collecting Immature Blacklegged Ticks

Lyme disease researchers often live-trap small mammals to collect blacklegged ticks.
Immature blacklegged ticks can be infected by feeding on mice that are carrying Lyme disease bacteria. Transmission can also occur from the ticks to mice.
Blacklegged Tick Nymph
Blacklegged Tick Nymph

- Size of a poppy seed
- Transmits most cases of disease because they are so difficult to detect
- Seeks a blood meal from mid-May to mid-July
Blacklegged Tick Engorgement
Male and Female Adult Blacklegged Tick

- Feed and mate on large animals in the fall or early spring
- After feeding, females lay eggs, then die
- Ticks that did not feed or mate go dormant
Two-Year Life Cycle of Blacklegged Tick

EGGS

LARVAE

NYMPHS

MEAL 1
- Mouse
- Bird

MEAL 2
(peak feeding time May-mid July)
- Person
- Mouse
- Dog

MEAL 3
- For adults that did not feed in fall
  - Person
  - Deer
  - Dog

SPRING

SUMMER

WINTER

FALL

ADULTS

Larvae molt into nymph stage

Nymphs molt into adults

Nymphs dormant

Eggs laid, adults die
Blacklegged Tick Habitat
Trails and Edge Habitat

- Blacklegged ticks live in woody, brushy areas that provide food and cover for hosts such as mice and deer.

- Exposure to these ticks can be greatest along trails and edges of woods.
Blacklegged ticks search for a host from the tips of low-growing vegetation, generally climbing onto a person or animal near ground level.
Blacklegged Tick Feeding
To Get Lyme Disease

• Blacklegged tick must be infected with Lyme disease bacteria

• Only the nymphs and adult females can transmit the Lyme disease bacteria

• Tick must be attached 24 - 48 hours before it passes bacteria to host
Lyme Disease Cases by State, 2002 (n = 23,763)
Tick-borne disease risk in Minnesota is highest in forested areas within the shaded zones.

Blacklegged ticks may also be found at lower levels in some forested areas outside this zone.
Reported Cases of Lyme Disease in Minnesota, 1986-2008 (n = 9,726)
Reported Cases of Lyme Disease in Minnesota by Location of Residence, 1998-2007 (n=6,905)
Reported Cases of Lyme Disease by County of Exposure, Twin Cities Metropolitan Area, 1998-2007

<table>
<thead>
<tr>
<th>County</th>
<th>No. of Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anoka</td>
<td>187</td>
</tr>
<tr>
<td>Washington</td>
<td>183</td>
</tr>
<tr>
<td>Ramsey</td>
<td>38</td>
</tr>
<tr>
<td>Dakota</td>
<td>32</td>
</tr>
<tr>
<td>Hennepin</td>
<td>18</td>
</tr>
<tr>
<td>Scott</td>
<td>6</td>
</tr>
<tr>
<td>Carver</td>
<td>5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>469</strong></td>
</tr>
</tbody>
</table>
## Top Ten Counties of Exposure for Reported Cases of Lyme Disease, 1998-2007

<table>
<thead>
<tr>
<th>County</th>
<th>No. (%) of Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Crow Wing</td>
<td>966 (20%)</td>
</tr>
<tr>
<td>2. Cass</td>
<td>370 (8%)</td>
</tr>
<tr>
<td>3. Pine</td>
<td>302 (6%)</td>
</tr>
<tr>
<td>4. Aitkin</td>
<td>207 (4%)</td>
</tr>
<tr>
<td>5. Anoka</td>
<td>187 (4%)</td>
</tr>
<tr>
<td>6. Washington</td>
<td>183 (4%)</td>
</tr>
<tr>
<td>7. Houston</td>
<td>125 (3%)</td>
</tr>
<tr>
<td>8. Morrison</td>
<td>124 (3%)</td>
</tr>
<tr>
<td>9. Hubbard</td>
<td>103 (2%)</td>
</tr>
<tr>
<td>10. Itasca</td>
<td>103 (2%)</td>
</tr>
<tr>
<td>Wisconsin</td>
<td>940 (20%)</td>
</tr>
<tr>
<td>Other</td>
<td>1,120 (24%)</td>
</tr>
</tbody>
</table>

**Total Cases with Known Exposure:** 4,730
Reported Cases of Lyme Disease by Month of Onset, Minnesota, 1999-2008 (n = 6,277*)

* Excluding 1,415 cases without erythema migrans or with unknown onset dates
Reported Cases of Lyme Disease by Age at Onset, Minnesota, 1999-2008 (n=7,610*)

* Excluding cases with unknown age at time of onset
### Reported Cases of Lyme Disease in Minnesota by Sex, 1999-2008

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cases</td>
<td>4,732 (62%)</td>
<td>2,960 (38%)</td>
<td>7,692</td>
</tr>
</tbody>
</table>
Human Anaplasmosis
Signs and Symptoms

• Fever (over 102 degrees)
• Chills and shaking
• Severe headache
• Muscle aches
Reported Cases of Human Anaplasmosis in Minnesota by Year, 1995-2008
(n = 1,602)
Reported Cases of Human Anaplasmosis by Age at Onset, Minnesota, 1999-2008 (n = 1,530)

*Excluding cases with unknown age*
### Human Anaplasmosis
#### Sex Distribution, 1999-2008

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>980 (64%)</td>
<td>554 (36%)</td>
<td>1,534</td>
</tr>
</tbody>
</table>
Reported Cases of Human Anaplasmosis by Month of Onset, Minnesota, 1999-2008 (n = 1,519*)

*Excluding 15 cases with unknown onset
Reported Cases of Human Anaplasmosis in Minnesota by County of Exposure, 1995-2007
(n = 1,323)

Cases with unknown exposure = 266
Cases with known exposure = 1,057
Minnesota = 722
Wisconsin = 99
Other State = 7

* Includes confirmed and probable cases
Babesiosis Signs & Symptoms

- High fever
- Chills
- Headache
- Muscle aches
- Fatigue
- Loss of appetite
Summary of Tick-Borne Diseases, Minnesota, 1999-2008
(n = 9,333)

Lyme disease: 7,692 (82%)
Human anaplasmosis: 1,534 (16%)
Babesiosis: 107 (1%)
Prevention Actions

• Campers, hikers, hunters, people in outdoor occupations, and people who live near the woods may be at risk in the counties known to have blacklegged ticks.

• Know whether you live, work or play in an area that has blacklegged ticks

• Take precautions when in blacklegged tick habitat, especially from May through July

• Remember, preventing exposure to blacklegged ticks requires diligence
Lyme Disease Vaccine

- Discontinued in 2002
Use repellents (DEET or permethrin), according to label directions.

Tucking pants into socks creates a barrier to ticks.

Wearing light-colored clothing helps to more easily spot ticks.
It is a good idea to check yourself and your children for ticks after spending time in a wooded or brushy area.
Pets

Check your dog or cat for ticks before bringing them inside.

There is a Lyme disease vaccine for dogs, but it does not prevent them from bringing ticks into the home.
Avoid Deer Tick Bites

• Be aware of high-risk times and places

• Walk in the center of trails to avoid picking up ticks from brush

• Wear long pants, light-colored clothing, and repellent
Avoiding Blacklegged Ticks at Home

If you live in area with ticks, they are usually located around the fringe of your yard and a wooded area.
Removing Attached Ticks

Ticks have barbed mouth parts. This means that ticks attached to the skin should be pulled out slowly and steadily.
To Remove a Deer Tick

- Use tick forceps or tweezers
- Grasp the tick close to the skin
- Pull outward S-L-O-W-L-Y, gently, and steadily
- Do not squeeze the tick
- Use an antiseptic on the bite
Important Messages

• Know whether you live, work or play in an area that has deer ticks

• Take preventive actions

• Seek early diagnosis and treatment
Whom to Contact

Minnesota Department of Health
651-201-5414

Metropolitan Mosquito Control District
651-645-9149
Minnesota Department of Health’s Lyme Disease Web Site

www.health.state.mn.us

Scroll down to “Diseases and Conditions” and click on “Diseases A to Z”

Click on “Lyme Disease”