

# CONTAGIOUS COMMENTS

## Department of Epidemiology

### Our Top Ten Tick Topics!

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#### 1. Tell me about ticks....

We have been receiving multiple calls about children with tick bites this season, so we thought a brief review of tick transmitted diseases would be valuable to clinicians.

Ticks have been around for more than 200 million years and there are more than 800 species. They are members of the arachnid family and they can transmit bacteria, viruses, rickettsiae, spirochetes, parasites and toxins. Humans are incidental, dead end hosts. Ticks normally feed on small vertebrates and tick "season" is generally April through September.

#### 2. How can I figure out what kind of tick it is and does it matter??

Although there are more than 30 species of ticks in Colorado, most tick diseases seen in Colorado are transmitted by the common wood tick, *Dermacentor andersoni*. The deer tick that transmits Lyme disease is not found in Colorado. After feeding on a blood meal, an engorged tick can increase their body weight by 100 times. See the photos of ticks below!

#### 3. What are the most common tick diseases we see in Colorado and how are they diagnosed and treated?

A local skin infection can occur at the site of the bite (usually staph or group A strep) and this can be treated with an oral antibiotic. A culture of the area is probably worthwhile to be sure it's not MRSA.

The most common tick transmitted disease in Colorado is **Colorado Tick Fever**. This illness is caused by a virus transmitted by the wood tick. The incubation period is short (2-3 days) and symptoms include fever, headache, and malaise. Leukopenia and thrombocytopenia are commonly seen and rash can be seen in 20% of cases. The disease is self-limited but can be biphasic. There is no readily available diagnostic test and treatment is symptomatic. It is estimated that hundreds of cases occur in Colorado each summer.

**Tularemia**, a bacterial infection caused by *Francisella tularensis* generally presents as ulceroglandular disease with a small ulcer at the site of the bite and fever and lymphadenitis at the site of the lymph node draining the area of the ulcer (often in the head and neck area). This is a serious disease. Cultures of the ulcer or node will grow the organism, and the State Health Dept can use PCR to identify the organism if a biopsy specimen is obtained. Let the micro lab know if you suspect tularemia so that the lab can use appropriate precautions. Doxycycline or gentamicin or a fluoroquinolone are appropriate antibiotics, but relapses can occur. This disease can also be transmitted by deer fly bites and by skinning rabbits or other animals.

#### 4. What are the serious tick transmitted diseases we wouldn't want to miss? (RMSF, Lyme, tick paralysis, tularemia)

We always worry about **Rocky Mountain Spotted Fever (RMSF)**, although the disease is actually quite rare in Colorado and much more common on the East Coast and Southern U.S. The disease is transmitted by the wood tick or dog tick and presents with fever, headache, malaise and a petechial rash beginning on the wrists and ankles and moving centrally. The disease can be fatal if untreated and early treatment with doxycycline should be started if the disease is suspected. Acute and convalescent serum titers can be sent to confirm the diagnosis.

Our group sees a number of children each year with presumed or proven **Lyme Disease**. All of these children have a history of travel to a Lyme endemic area (check the CDC website for an exact map of high rate areas). Most cases we see were acquired from travel to Wisconsin or to East Coast states. The incubation period is usually 7-14 days (range 3-30). The early presentation of Lyme disease is erythema chronicum migrans, a large flat, erythematous lesion that develops central clearing. Patients usually have fever and myalgias. Check the Red Book for treatment information since route and duration of antibiotic depend on the timing of infection and the nature of the symptoms. Amoxicillin is usually the drug of choice.

**Tularemia** is another serious tick transmitted disease. Please see our comments about Tularemia in question #3.

**Tick Paralysis** is caused by a paralyzing toxin secreted by the tick and presents as ascending paralysis. A few years ago, 4 cases were seen in June and three of the four had been vacationing in the Estes Park area. The treatment is supportive therapy and finding and removing the tick. The disease can be difficult to diagnose, especially in girls with long hair where the tick may be hidden in the scalp or neck and difficult to see.

**5. What lab tests are helpful in evaluating a febrile child in Colorado (with no travel history) with a history of a tick removed several days earlier? Is any therapy indicated?**

1. Ticks usually require a blood meal and some time on the host in order to transmit infection to the host, so removing a non engorged tick usually means the chance that any infection has been transmitted is quite low. Clean the area well and no antibiotics are indicated.
2. If you remove an engorged tick in Colorado, the usual recommendation is to make sure all the mouth parts are removed, clean the area and ask the family to watch the child carefully for the next week or two. The incubation periods are as follows:

<b>Colorado Tick Fever</b>	4 days (range 1-14)
<b>Tularemia</b>	3-5 days (range 1-21)
<b>Tick paralysis</b>	Tick attached for 3 days before they begin to secrete toxin

**6. A mom brings her 7 year old boy to you in June with a history that the child has just returned from a week in New Hampshire at a summer camp. No tick bite was recognized while he was there. He now has fever and a large macular erythematous lesion on his thigh with central clearing. How should I manage this case?**

This is the classic lesion of early Lyme Disease. The lesion is called erythema chronicum migrans (ECM) and is usually seen as a solitary lesion at the site of the tick bite. However, many patients may have no history of tick bite, as the tick that transmits Lyme Disease is very small. The ECM

lesion may begin as a small lesion that then expands to several centimeters and develops central clearing. Diagnostic testing is not indicated or useful at this stage, as it is too soon for the patient to have developed an antibody response to the infecting agent. The diagnosis of Lyme Disease at this stage is made based on the presence of the characteristic lesion. Oral antibiotics are indicated. For children 8 years of age and older, doxycycline is recommended by the AAP Red Book; for children less than 8 years of age, amoxicillin is the preferred agent.

**7. Can a tick transmit more than one disease?**

Occasionally more than one disease can be transmitted by a single tick bite. Babesiosis, Lyme disease, and Anaplasmosis all share the same vector (*Ixodes scapularis*), so in an area where ticks are known to be infected with more than one of these agents, a patient could be co-infected. This is usually clinically suspected if patients are sicker than usual, have manifestations not explained by a single agent, or do not improve with standard therapy.

**8. A child's father just removed an engorged tick from the leg of the child. Is any prophylaxis indicated?**

For all tick bites, except possibly those in a Lyme endemic area, no prophylaxis is indicated, due to low risk of infection. For tick bites in a Lyme endemic area, the question is controversial. The AAP Red Book states that prophylaxis is not routinely indicated, particularly if the tick is not engorged and has been attached <72 hours. However, some experts recommend a single 200 mg dose of oral doxycycline (4.4 mg/kg if body weight is <45 kg) for children ≥8 years of age who have been bitten by a tick from an area with "hyperendemic" infection (defined as >20% ticks infected with *Borrelia burgdorferi*), particularly if the tick is engorged, attachment time is thought to be >72 hours, and prophylaxis can be started within 72 hours after tick removal. There is no data on use of amoxicillin for prophylaxis in children <8 years of age.

**9. What is the best way to prevent a tick transmitted infection?**

The best way is to prevent the tick bite in the first place. This is accomplished by use of tick repellent, wearing long pants and long sleeves when hiking, and avoiding areas with tall grass and brush. Adults should check themselves and their children for ticks promptly after being in an area with possible tick exposure, with careful attention to all parts of the body including the hair,

behind the ears, and in the axillae and groin. Studies have shown increased risk of transmission of a tick-borne infection with longer tick attachments, particularly if the tick is attached for >72 hours. If a tick is found, it should be removed immediately.

**10. What is the best way to remove an engorged tick?**

The best way to remove a tick is with a pair of fine forceps or tweezers. Occasionally infectious agents could be transmitted by contact with tick secretions/body fluids with an area of broken skin, so wear gloves if possible. Grasp the tick as close to the skin surface as possible with the forceps near the mouth parts and pull perpendicular to the plane of the skin with steady even traction until the tick releases its grip. Be careful not to crush or squeeze the body of the tick, and do not use a twisting motion to remove the tick. Wash the area with soap and water. The person removing the tick should also wash their hands with soap and water.

**Wood Tick:**



**Deer Tick:**



**Dog Tick:**



**Soft Tick (Ornithodoros):**



References:

<http://www.ext.colostate.edu/pubs/insect/05593.html>

**Lyme Disease:**



**Tick Size:**

Blacklegged Tick (*Ixodes scapularis*)



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Disease	US Cases/Yr	Colorado Cases/Yr	Agent	Geographic Area	Therapy*	Comments
<b>Anaplasmosis</b> (Previously known as Human Granulocytic Ehrlichiosis)	~1000	No endemic disease	<i>Anaplasma phagocytophila</i>	Northeast, Upper Midwest, and West coast especially CT, MA, MN, NY, RI, WI	Doxycycline	
<b>Babesiosis</b>	Not a reportable disease until 2011-unknown	No endemic disease	<i>Babesia microti</i>	Northeast and upper Midwest	Treatment depends on degree of illness; Ill patients treated with atovaquone + azithromycin OR clindamycin + quinine (see RedBook for details)	Multiple thick and thin smears; Parasite seen in RBCs.
<b>Colorado Tick Fever</b>	Several hundred cases	~200 cases	Colorado tick fever virus that infects RBCs	Western Black Hills through the West Coast	Supportive care—can be biphasic	Usually acquired from ticks at elevations of 4,000-10,000 feet
<b>Ehrlichiosis</b>	~1000	No endemic disease	<i>Ehrlichia chafeensis</i> and <i>Ehrlichia ewingii</i>	Southeastern to south central states especially AR, MO, OK	Doxycycline	
<b>Lyme Disease</b>	~30,000	No endemic disease	<i>Borrelia burgdorferi</i>	Northeast, upper Midwest, West coast especially CT, DE, MD, ME, MA, MN, NJ, NH, NY, PA, VA, WI	Amoxicillin or Doxycycline; Ceftriaxone if parenteral antibiotics indicated (See RedBook for details).	Lyme disease has several clinical stages and treatment
<b>Powassan encephalitis</b>	Very rare 6-10	No endemic disease	Powassan virus (flavivirus)	Upper Northeast (Maine, VT) and Canada	Supportive	
<b>Q fever</b>	~150 total cases of Q fever (unknown how many are tick-borne)	Rare	<i>Coxiella burnetii</i>			Tick borne infections with Q fever are rare
<b>Relapsing Fever</b>	~25 cases	~10 cases	<i>Borrelia hermsii</i> and <i>B. recurrentis</i>	Reported in AZ, CA, CO, ID, KS, MT, NV, NM, OH, OK, OR, TX, UT, WA, and WY	Doxycycline	Can see the spirochete on a peripheral blood smear! Associated with sleeping in rustic cabins.

Disease	US Cases/Yr	Colorado Cases/Yr	Agent	Geographic Area	Therapy*	Comments
<b>RMSF (Rocky Mountain Spotted Fever)</b>	~200 confirmed ~2000 probable cases	1-10 cases	<i>R. rickettsia</i>	More common in East Coast states especially NC, OK, AR, TN, MO	Doxycycline	Associated with fever, rash starting on wrists and ankles, leukopenia, thrombocytopenia
<b>STARI (Southern Tick Associated Rash Illness)</b>	Unknown-not a notifiable disease	Unknown (probably rare to none)	Unknown	Eastern seaboard, Midwest, and Southeast especially ME, NY, NC, OH, IN, IL, IA, NE TX	Unknown if antibiotics alter course; some physicians treat with Amoxicillin or Doxycycline with similar length of treatment as for Lyme Disease	Has "bull's eye-like" lesion similar to that seen in Lyme Disease
<b>Tick Paralysis</b>	Unknown	1-5	Neurotoxin released by tick salivary glands	Mostly Western US, but can be seen in East, SE, South Central	Remove tick; Supportive care	Presents as ascending paralysis or cerebellar ataxia
<b>Tularemia</b>	~100	5	<i>Francisella tularensis</i>	Occurs throughout the US	Ciprofloxacin, Doxycycline, and Gentamicin	Also seen after deer fly bites; Relapses sometimes occur after treatment

\*For treatment, refer to the Red Book, Report of the Committee of Infectious Disease, American Academy of Pediatrics 2009.

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Thank you for your interest in our publication.

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