

Ticks and Lyme Disease



For more information about Lyme disease, visit <http://www.cdc.gov/Lyme>

How to prevent tick bites when working outdoors

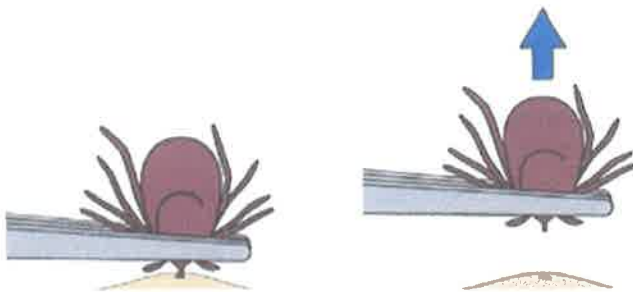
Ticks can spread disease, including Lyme disease. Protect yourself:

- Use insect repellent that contains 20 - 30% DEET.
- Wear clothing that has been treated with permethrin.
- Take a shower as soon as you can after working outdoors.
- Look for ticks on your body. Ticks can hide under the armpits, behind the knees, in the hair, and in the groin.
- Put your clothes in the dryer on high heat for 60 minutes to kill any remaining ticks.

How to remove a tick

1. If a tick is attached to you, use fine-tipped tweezers to grasp the tick at the surface of your skin.
2. Pull the tick straight up and out. Don't twist or jerk the tick—this can cause the mouth parts to break off and stay in the skin. If this happens, remove the mouth parts with tweezers if you can. If not, leave them alone and let your skin heal.
3. Clean the bite and your hands with rubbing alcohol, an iodine scrub, or soap and water.
4. You may get a small bump or redness that goes away in 1-2 days, like a mosquito bite. This is not a sign that you have Lyme disease.

Note: Do not put hot matches, nail polish, or petroleum jelly on the tick to try to make it pull away from your skin.



If you remove a tick quickly (within 24 hours) you can greatly reduce your chances of getting Lyme disease.



Facial paralysis.



Bull's eye rash on the back.



Arthritic knees.



The bite of a blacklegged tick can transmit the bacteria that cause Lyme disease.

When to see your doctor

See a doctor if you develop a fever, a rash, severe fatigue, facial paralysis, or joint pain within 30 days of being bitten by a tick. Be sure to tell your doctor about your tick bite. If you have these symptoms and work where Lyme disease is common, it is important to get treatment right away.

If you do not get treatment, you may later experience severe arthritis and problems with your nerves, spinal cord, brain, or heart.

Antibiotics are used to treat Lyme disease

Your doctor will prescribe specific antibiotics, typically for 2-3 weeks. Most patients recover during this time. You may feel tired while you are recovering, even though the infection is cured.

If you wait longer to seek treatment or take the wrong medicine, you may have symptoms that are more difficult to treat.

Locking ahead to recovery

Take your antibiotics as recommended. Allow yourself plenty of rest. It may take time to feel better, just as it takes time to recover from other illnesses.

Some people wonder if there is a test to confirm that they are cured. This is not possible. Your body remembers an infection long after it has been cured. Additional blood tests might be positive for months or years. Don't let this alarm you. It doesn't mean you are still infected.

Finally, practice prevention against tick bites. You can get Lyme disease again if you are bitten by another infected tick.

Additional information

1. <http://www.cdc.gov/Lyme>
2. The Clinical Assessment, Treatment, and Prevention of Lyme Disease, Human Granulocytic Anaplasmosis, and Babesiosis: Clinical Practice Guidelines by the Infectious Diseases Society of America
<http://cid.oxfordjournals.org/content/43/9/1089.full>
3. Tick Management Handbook (Connecticut Agricultural Experiment Station, New Haven)
http://www.ct.gov/caes/lib/caes/documents/special_features/tickhandbook.pdf

For more information please contact Centers for Disease Control and Prevention
1600 Clifton Road NE, Atlanta, GA 30333
Telephone: 1-800-CDC-INFO (232-4636)/TTY: 1-888-232-63548
Email: cdcinfo@cdc.gov Web: www.cdc.gov



Powassan virus infection

What is Powassan virus infection?

Powassan virus (POWV) infection is a rare tickborne viral infection occurring in Wisconsin and other northern regions of North America. POWV infection is caused by an arbovirus (similar to the mosquito-borne West Nile virus) but it is transmitted to humans by the bite of an infected tick instead of a mosquito bite. The virus is named for Powassan, Ontario where it was first discovered. Eleven reported cases of POWV infection have been detected among Wisconsin residents during 2003 to 2011. At least 50 cases have been detected in the United States and Canada since 1958.

How is Powassan virus spread?

In Wisconsin, *Ixodes scapularis* (known as the blacklegged tick or deer tick) is capable of transmitting Powassan virus. In addition, several other tick species in North America can carry POWV, including other *Ixodes* species and *Dermacentor andersoni*.

Where does Powassan virus infection occur?

Powassan virus infection occurs mostly in northeastern and upper Midwestern states. In Wisconsin, cases have been detected in areas where there is a high risk of exposure to ticks.

Who gets Powassan virus infection?

Everyone is susceptible to Powassan virus, but people who spend time outdoors in tick-infested environments are at an increased risk of exposure. In the upper Midwest, the risk of tick exposure is highest from late spring through autumn.

What are the symptoms of Powassan virus infection?

Symptoms usually begin 7-14 days (range 8-34 days) following infection. Some people who are infected may experience mild illness or no symptoms. Symptoms of illness usually begin with acute onset of fever and may include headache, muscle weakness, nausea, vomiting, stiff neck, fatigue, confusion, paralysis, speech difficulties, and memory loss. POWV infects the central nervous system and can cause encephalitis and meningitis. About 10-15% of persons infected with POWV will experience severe illness and survivors may develop long-term neurological problems.

How is Powassan virus infection diagnosed?

Because symptoms of Powassan virus infection are similar to symptoms of other arboviral infections, arboviral diseases can be difficult to differentiate. Blood tests can detect antibodies to POWV but are not readily available in commercial laboratories. In Wisconsin, arboviral panel testing can be requested through the Wisconsin State Laboratory of Hygiene (includes tests for West Nile, California/La Crosse, St. Louis, Eastern equine, and Western equine encephalitis viruses). The Wisconsin State Laboratory of Hygiene will forward the Powassan virus test request to the Centers for Disease Control and Prevention (CDC) for testing.

What is the treatment for Powassan virus infection?

Currently, there are no medications available for the treatment of Powassan virus illness but supportive care can be used to manage and alleviate symptoms. No vaccine is available to prevent people from becoming infected with Powassan virus.

What precautions can be taken to prevent Powassan virus infection?

The most effective way to prevent Powassan virus infection is to avoid tick bites. When in areas that may be tick-infested, the following precautions can reduce the risk of acquiring Powassan virus illness and other tickborne infections:

Rocky Mountain Spotted Fever (tick-borne typhus fever)

Disease Fact Sheet Series

What is Rocky Mountain spotted fever?

Rocky Mountain spotted fever (RMSF) is a disease caused by a microorganism transmitted to humans by the bite of an infected American dog tick (*Dermacentor variabilis*) and by several other tick species. Only 16 cases were reported in Wisconsin between 1980 and 2003. Most of these infections were acquired outside of Wisconsin.

Who gets RMSF?

RMSF is rare in Wisconsin. The majority of cases in the U.S. occur in the southeastern states. In spite of its name, the disease is not common in the mountain states. Children and young adults are most frequently affected. Disease incidence is directly related to exposure to tick infested habitats.

How is RMSF spread?

RMSF is spread by the bite of an infected tick (the American dog tick, the lone-star tick or the wood tick) or by contamination of the skin with the tick's body fluids or feces. Person to person and direct animal to human transmission of RMSF does not occur.

What are the symptoms of RMSF?

RMSF is characterized by a sudden onset of moderate to high fever (which can last for two or three weeks), severe headache, fatigue, deep muscle pain, chills and rash. The rash begins on the legs or arms may include the soles of the feet or palms of the hands and may spread rapidly to the trunk or rest of the body. Not every case of RMSF will have the rash.

How soon do symptoms appear?

Symptoms usually appear between 3-14 days after the bite of an infected tick.

Does past infection with RMSF make a person immune?

One attack probably provides permanent immunity.

What is the treatment for RMSF?

Certain antibiotics such as tetracycline or chloramphenicol are used to treat the disease.

What can be done to prevent the spread of RMSF?

Frequent checking of one's clothing and skin for ticks when in infested areas is extremely useful in reducing disease. Tick repellents applied to legs and clothing may be helpful to prevent tick attachment. Mowing grass frequently in yards and along fences helps to reduce tick populations.

ANAPLASMOSIS AND EHRLICHIOSIS



Anaplasmosis and ehrlichiosis are similar diseases caused by two different groups of bacteria called *Anaplasma* and *Ehrlichia*. In Wisconsin, both anaplasmosis and ehrlichiosis are spread by the bite of an infected *Ixodes scapularis* tick (also known as the black-legged tick or deer tick). In Wisconsin, anaplasmosis is far more common than ehrlichiosis, but recently there has been an increase in cases of ehrlichiosis. Anyone can get anaplasmosis or ehrlichiosis, but people who spend more time outdoors are at a higher risk of being bitten by an infected tick.

What causes it?



- ▶ Anaplasmosis and ehrlichiosis are spread to humans through the bite of an infected black-legged tick. Ticks can be found in areas with woods, brush, or tall grass.
- ▶ Anaplasmosis and ehrlichiosis are spread during the spring, summer, and fall by both adult ticks and the young nymph stage of the tick. The risk for anaplasmosis and ehrlichiosis is highest in the spring and early summer, when the nymphs are most active. People may not remember being bitten by a tick because the black-legged nymphs are very small, about the size of a poppy seed.

What are the signs and symptoms?



Symptoms of anaplasmosis and ehrlichiosis usually show up 1-2 weeks after being bitten by an infected tick. The symptoms vary greatly from person to person. People with a weakened immune system are more likely to have severe symptoms.

- ▶ Fever
- ▶ Headache
- ▶ Muscle pain
- ▶ Chills
- ▶ Fatigue
- ▶ Nausea
- ▶ Vomiting
- ▶ Diarrhea
- ▶ Rash (rare with anaplasmosis)

What are the treatment options?



- ▶ If not treated, anaplasmosis and ehrlichiosis can be serious illnesses.
- ▶ Both anaplasmosis and ehrlichiosis can be treated with the antibiotic doxycycline.

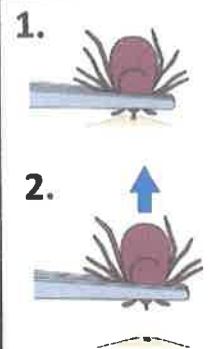
How can it be prevented?



Follow these steps to reduce your risk of being bitten by a tick:

- ▶ When outdoors, wear a long-sleeved shirt, long pants, and high socks with pant cuffs tucked into the socks. Wear light-colored clothing so ticks are easier to see.
- ▶ Walk in the center of trails and try not to brush up against shrubs and tall grass.
- ▶ Wear insect repellent with 20-30% DEET, or use 0.5% permethrin on clothes. Follow directions on manufacturer's label.
- ▶ Do tick checks on yourself and others after coming in from outside and quickly remove any ticks.
- ▶ Take a shower after coming in from outside to remove insect repellent and any ticks on the body.
- ▶ Put clothing worn outside in dryer on high for at least 10 minutes to kill any ticks that may still be on clothes.

HOW TO REMOVE A TICK:



Use tweezers to remove the tick. Grip the tick by its mouthparts, as close to the skin as possible. Pull straight up. Wash the area with soap and water.



LYME DISEASE



Lyme disease is an illness caused by the bacteria *Borrelia burgdorferi* and *Borrelia mayonii*. It is spread to humans by the *Ixodes scapularis* tick (also known as the black-legged tick or deer tick). Anyone can get Lyme disease, but people who spend more time outdoors are at a higher risk of being bitten by an infected tick. In Wisconsin, the highest number of cases are seen in the western and northern regions, but recently cases have increased in the central and eastern regions. The average number of reported cases has more than doubled over the past 10 years.

What causes it?



- ▶ Lyme disease is spread to humans through the bite of an infected black-legged tick. Ticks can be found in areas with woods, brush, or tall grass. A tick must be attached for at least 24 hours to spread Lyme disease to a person.
- ▶ Lyme disease is spread during the spring, summer, and fall by both adult ticks and the young nymph stage of the tick. The risk for Lyme disease is highest in the spring and early summer, when the nymphs are most active. People may not remember being bitten by a tick because the black-legged nymphs are very small, about the size of a poppy seed.

What are the signs and symptoms?



The early symptoms can show up 3-30 days after being bitten by the tick. If not treated, the later symptoms can take weeks to months to show up.

Early Symptoms

- ▶ Circular reddish rash (does not appear in all cases)
- ▶ Fever
- ▶ Headache
- ▶ Stiff neck
- ▶ Muscle/joint pain

Late Symptoms

- ▶ Meningitis (brain swelling)
- ▶ Facial muscle weakness
- ▶ Heart abnormalities
- ▶ Arthritis
- ▶ Joint pain/swelling

What are the treatment options?



Lyme disease can be treated with antibiotics. It is important to get treatment as soon as possible after symptoms start. If treatment is delayed, it can spread to the joints, heart, and nervous system and have long-term effects.

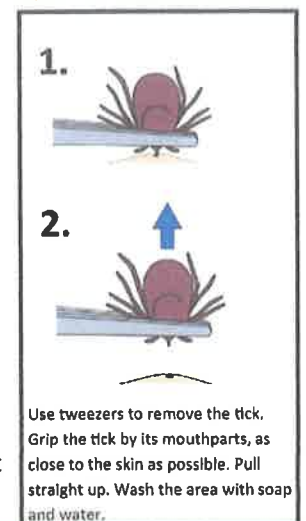
How can it be prevented?



Follow these steps to reduce your risk of being bitten by a tick:

- ▶ When outdoors, wear a long-sleeved shirt, long pants, and high socks with pant cuffs tucked into the socks. Wear light-colored clothing so ticks are easier to see.
- ▶ Walk in the center of trails and try not to brush up against shrubs and tall grass.
- ▶ Wear insect repellent with 20-30% DEET, or use 0.5% permethrin on clothes. Follow directions on manufacturer's label.
- ▶ Do tick checks on yourself and others after coming in from outside and quickly remove any ticks.
- ▶ Take a shower after coming in from outside to remove insect repellent and any ticks on the body.
- ▶ Put clothing worn outside in dryer on high for at least 10 minutes to kill any ticks that may still be on clothes.

HOW TO REMOVE A TICK:



BUREAU OF COMMUNICABLE DISEASES

<https://www.dhs.wisconsin.gov/dph/bcd.htm> | DHSDPHBCD@dhs.wi.gov

Wisconsin Department of Health Services | Division of Public Health



BABESIOSIS



Babesiosis is a tickborne disease caused by a tiny parasite, *Babesia*, that infects red blood cells. *Babesia* are spread by the *Ixodes scapularis* tick (also called the black-legged tick or deer tick). Babesiosis is most common in the Northeastern United States and upper Midwest (including Wisconsin) and peaks during the warm months. Anyone can get babesiosis, but it is more severe in the elderly and in those who have a weakened immune system. Babesiosis can range from relatively mild to life threatening.

What causes it?



- ▶ Babesiosis is spread to humans through the bite of an infected black-legged tick. Ticks can be found in areas with woods, brush, or tall grass.
- ▶ Babesiosis is spread during the spring, summer, and fall by both adult ticks and the young nymph stage of the tick. The risk for babesiosis is highest in spring and early summer, when the nymphs are most active. People may not remember being bitten by a tick because the black-legged nymphs are very small, about the size of a poppy seed.
- ▶ It is rare, but people can also get babesiosis through blood transfusions that are contaminated with *Babesia*.

What are the signs and symptoms?



It is possible to not have any symptoms and have babesiosis. People who are elderly, have a weak immune system, do not have a spleen, or have other serious health conditions can have more severe symptoms.

Common Symptoms

- ▶ Flu-like symptoms (fever, chills, headache, body aches, loss of appetite, nausea, or fatigue)
- ▶ Anemia
- ▶ Low blood platelets
- ▶ Jaundice
- ▶ Spleen and liver enlargement

Symptoms in Severe Cases

- ▶ Difficulty breathing
- ▶ Heart attack
- ▶ Kidney failure
- ▶ Liver disease
- ▶ Altered mental status
- ▶ Death

What are the treatment options?



Antibiotics used together with certain drugs that treat malaria have been found to work well in most patients. Very severe cases may require a blood transfusion.

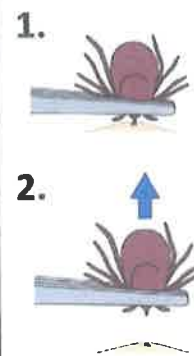
How can it be prevented?



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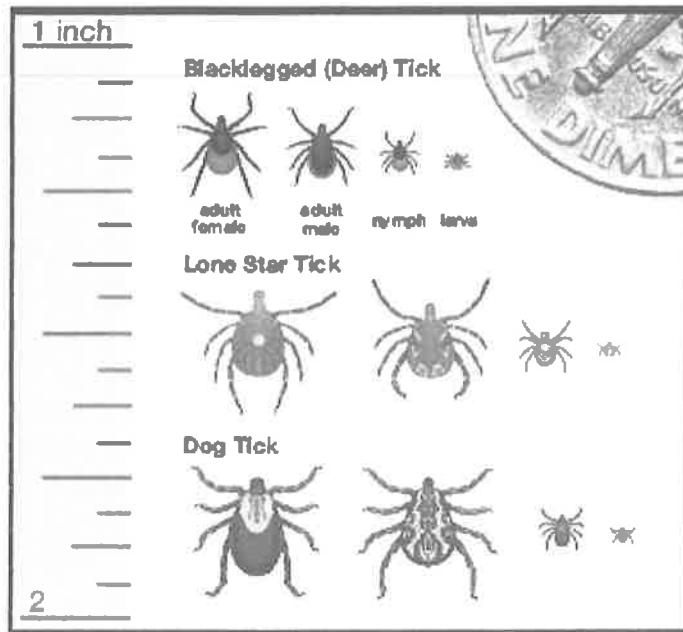
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- ▶ Walk in the center of trails and avoid brushing up against shrubs and tall grass.
- ▶ Wear insect repellent with 20-30% DEET or use 0.5% permethrin on clothing. Follow directions on manufacturer's label.
- ▶ Do tick checks on yourself and others after coming in from outside and promptly remove any ticks.
- ▶ Take a shower after coming in from outside to remove insect repellent and any ticks on the body.
- ▶ Put clothing worn outside in dryer on high for at least 10 minutes to kill any ticks that still remain on clothing.

HOW TO REMOVE A TICK:



Use tweezers to remove the tick. Grip the tick by its mouthparts, as close to the skin as possible. Pull straight up. Wash the area with soap and water.







DEER
TICK



WOOD
TICK



BROWN
DOG
TICK

wiki [How to Identify a Deer Tick](#)

