



# Ticks and Your Health

**Preventing tick-borne illness  
in Michigan**

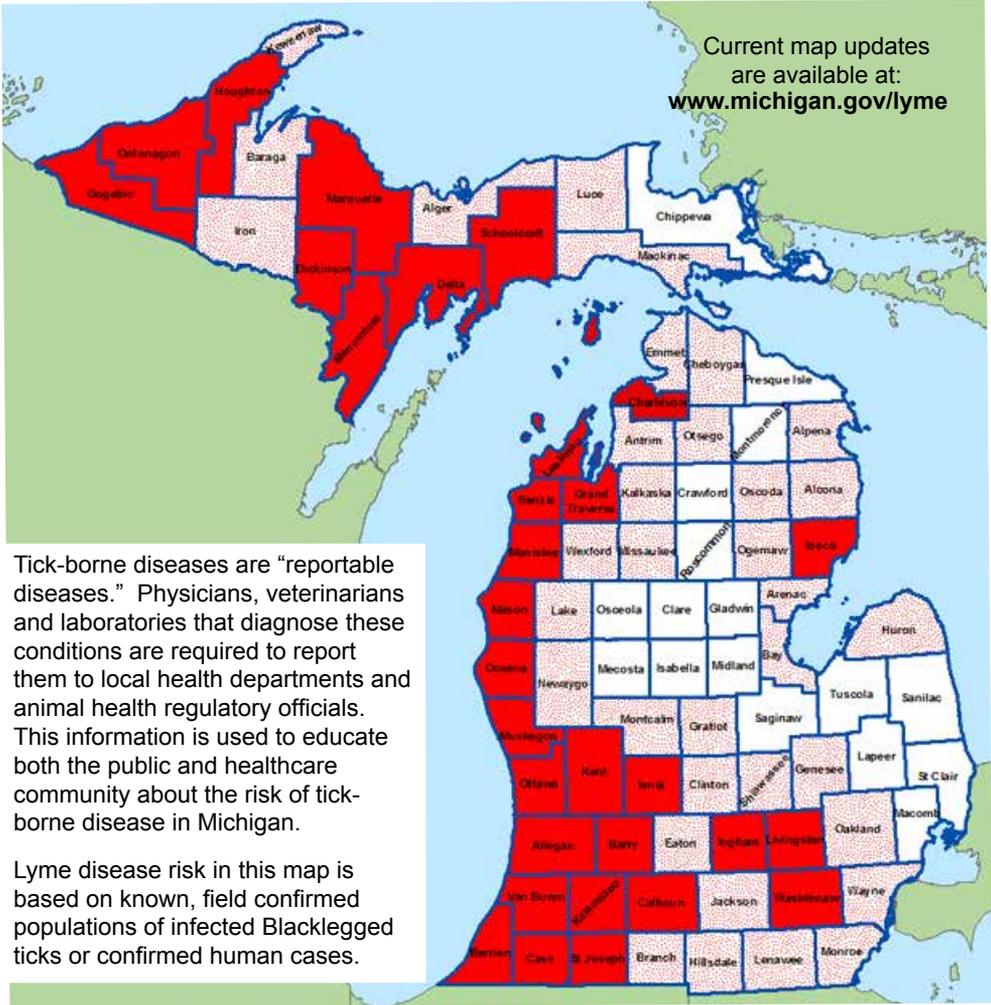
Michigan Department of Health & Human Services

Michigan Department of Natural Resources

Michigan State University

[www.treatmentok.com](http://www.treatmentok.com)

# Michigan Lyme Disease Risk



**County with known risk for Lyme disease**

- ✦ At least 2 confirmed local exposures, and/or
- ✦ Ticks or animals with Lyme bacteria



**County with potential risk for Lyme disease**

- ✦ Adjacent to a confirmed county, and/or
- ✦ Blacklegged ticks present but not infected with Lyme disease bacteria



**County with negative tick sampling information or lacking information**

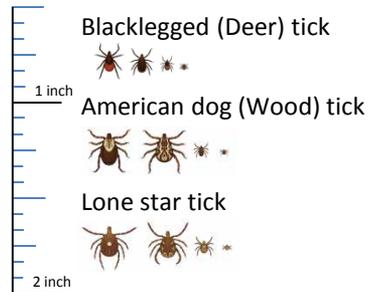
## General Information

Ticks are closely related to insects and spiders, and there are over 20 known tick species in Michigan. Most often, they live out their lives feeding on wildlife, however people may be bitten when they work or recreate in areas where ticks live. Ticks are most often associated with natural areas such as grassy shorelines, wooded areas, or fields near wooded areas. Ticks are rarely encountered indoors unless brought inside on the clothing of people or on the body of a pet.

Several species of ticks are known to bite people and pets, and may harbor dangerous bacteria, viruses, or parasites. Not all ticks carry diseases, but tick-borne diseases do occur in Michigan, and can be serious or fatal if not properly diagnosed and treated.

Ticks have three life stages – larval, nymphal and adult. (See size comparison photo). Ticks feed painlessly by attaching themselves to the skin with their piercing mouthparts. They can attach anywhere on the body, but are commonly found in the hairline, ears, waistline, armpit, and groin.

### Actual Size Comparison



Tick stages: female, male, nymph, larva

Ticks will normally stay attached and continue to feed for several days becoming greatly engorged, which can aid in their discovery. It is important to take precautions when recreating or working in wooded or grassy environments. Examples include avoiding areas with a lot of ticks, checking skin and clothing for ticks daily, and using insect repellents (see page 10 for more information).

It is important to inform a physician if you are ill and have had recent exposure to ticks. This information can be crucial for accurately diagnosing diseases.



Left to right: American dog tick female, Lone star tick female, blacklegged tick female, blacklegged tick nymph.

# The Ticks

Ticks are best identified by an experienced professional. We know a lot about ticks in Michigan because people send them to state agencies for identification. See the section on “Tick Identification and Testing” for information on how to submit ticks for identification.

**The five most common ticks found on people and pets, by percent, in Michigan are:**

## American dog tick (wood tick)

# 76%

of all ticks submitted in Michigan

*Where found:*  
Widespread throughout the Lower and Upper Peninsulas of Michigan in wooded and grassy areas.

### Key facts:

American dog ticks are large brown ticks with ornate white markings. Female ticks are generally active from May through July and will bite people and pets.



**Diseases:** Rocky Mountain spotted fever and tularemia.

## Blacklegged tick (deer tick)

# 15%

of all ticks submitted in Michigan

*Where found:*  
Emerging and sporadic throughout the Lower and Upper Peninsulas of Michigan in wooded and grassy areas.

### Key facts:

The blacklegged tick is a small tick with black legs, and has a rounded black scutum, or shield shaped plate behind its head. It may be hard to distinguish from other species. The blacklegged tick is an emerging species in Michigan and is a possible vector of several diseases.



**Diseases:** Lyme disease, anaplasmosis, babesiosis, deer tick virus, and Ehrlichia muris-like disease.

\* Sesame seed

### Lone star tick

**5%**

of all ticks  
submitted in  
Michigan

*Where found:* This tick is rare in Michigan, but is becoming more common. It is found in wooded areas with populations of white-tailed deer.



*Diseases:* Ehrlichiosis and tularemia.

### Woodchuck tick

**3%**

of all ticks  
submitted in  
Michigan

*Where found:* Normally found in woodchuck and skunk dens, but may also be found in wooded areas where other mammal species are abundant.



*Diseases:* Powassan encephalitis, a potentially serious viral illness.

*Key facts:* Normally bite pets when they are near animal dens. Will also bite people working or recreating in the woods.

### Brown dog tick (kennel tick)

**1%**

of all ticks  
submitted in  
Michigan

*Where found:* Able to survive and breed in indoor environments as well as outdoors in grassy and brushy areas.



*Diseases:* Rocky Mountain spotted fever, canine babesiosis, and canine ehrlichiosis.

*Key facts:* May be hard to distinguish from other ticks because of its “plain” brown appearance. It is often found in shelters, breeding facilities, and dog kennels. Hygienic practices in these facilities can prevent infestations.

\* Sesame seed

### Other tick species

There are many other tick species in Michigan. Most are seen less frequently on people and pets, and are not associated with human illness.

# Lyme Disease

Lyme disease is an illness caused by the spirochete bacterium *Borrelia burgdorferi*. In the midwestern and eastern U.S., this disease is transmitted to people and animals by the bite of an infected blacklegged tick. Studies of Lyme disease have shown that a tick infected with *B. burgdorferi* must be attached to its host for 36-48 hours for the bacteria to be transmitted. **Prompt removal of ticks is the best method to decrease the chance of infection.**

The most important factors in preventing Lyme disease are:

1. Knowing where ticks can be encountered (see the map at the front of this brochure)
2. Preventing tick bites
3. Removing ticks promptly if they do bite
4. Seeking prompt medical care if illness occurs after a tick bite

The symptoms of Lyme disease may include:

## 3-30 days

after exposure  
to ticks OR  
their habitat

### Early localized Lyme disease

- Chills and fever
- Headaches
- Muscle and joint pain
- A characteristic skin rash, called erythema migrans (EM) present in 70-80% of cases

## Erythema migrans (EM) rash: It's not always a "bull's eye"

Most people recognize the classic target lesion or bull's-eye rash. However, most are not aware that the majority of Lyme disease rashes are uniformly red or reddish-blue. In the late spring and early summer when Lyme disease is most prevalent, any of the rashes shown here could be indicative of Lyme disease.



Above (from left to right): A) Classic bull's eye rash with "target" appearance; B) Uniformly red lesion; C) Multiple, uniformly red lesions; D) Reddish-blue rash with expanding and clearing ring.

# Weeks to Months

without treatment

## Disseminated Lyme disease

- Additional EM rashes on other parts of the body
- Loss of muscle tone on one or both sides of the face (Bell's palsy)
- Headache or stiff-neck due to meningitis
- Joint swelling, usually in one or more large joints, especially the knees
- Heart palpitations or dizziness due to changes in heart rhythm

*Consult with your physician if you think you may have contracted Lyme disease. Lyme disease can be diagnosed and treated based on symptoms. If diagnostic testing is necessary, the MDHHS laboratory and other reference laboratories offer the nationally-standardized blood test for Lyme disease.*

## Other Tick-Borne Illnesses

Ticks may transmit numerous other diseases to people and pets and although they are less common than Lyme disease, it is just as important to protect yourself. If you are bitten by a tick, monitor your general health. Tick-borne diseases often begin with a “flu-like” illness, but may rapidly progress to more serious illness. If you have symptoms of fever, headache, body aches, or rash after being bitten by a tick, or after being in an area with ticks, see your healthcare provider.

## Treatment

Lyme disease, tularemia, Rocky Mountain spotted fever (RMSF), anaplasmosis, and ehrlichiosis are all treatable with antibiotics. Patients and pets treated in the early stages with antibiotics usually recover rapidly and completely. Doxycycline is the most effective treatment of ALL Rickettsial diseases, including RMSF, anaplasmosis, and ehrlichiosis. It is recommended by the American Academy of Pediatrics (AAP) and the Centers for Disease Control and Prevention (CDC) for patients of ALL ages.

For additional details about Lyme disease and other tick-borne diseases in Michigan, please see the table on the next page.

The characteristic rash of Rocky Mountain spotted fever generally begins on the arms or legs, then spreads to the trunk of the body.



# Diseases Spread by Ticks in Michigan

Disease	Arthropod Vector (in Michigan)	Incubation Time	Signs & Symptoms	Rash Appearance	Comments
<b>Lyme disease</b> ( <i>Borrelia burgdorferi</i> )	<i>Ixodes scapularis</i> (Blacklegged tick)	3-30 days	<p><b>Early localized disease:</b></p> <ul style="list-style-type: none"> <li>Fever and chills</li> <li>Headaches</li> <li>Muscle and joint pain</li> <li>Characteristic erythema migrans rash</li> </ul> <p><b>Disseminated disease: (weeks to months after exposure):</b></p> <ul style="list-style-type: none"> <li>Multiple EM lesions</li> <li>Nervous system abnormalities including nerve paralysis (facial muscles), meningitis.</li> <li>Arthritis, in large joints, especially the knee.</li> <li>Rarely, irregularities of the heart rhythm may occur</li> </ul>	<p><b>Erythema migrans (EM):</b> Beginning as a red macule or papule that appears at the site of the tick bite within 3 days to 1 month after the bite of an infected tick. The red area expands to form a "bull's-eye" pattern 25 cm across. The EM is usually not painful or itchy.</p>	<p>Disease transmission does not occur unless tick is attached longer than 24-48 hours.</p> <p>Treatable with antibiotics, preferably doxycycline.</p>
<b>Rocky Mountain spotted fever</b> ( <i>Rickettsia rickettsii</i> )	<i>Dermacentor variabilis</i> (American dog tick)	2-14 days	<ul style="list-style-type: none"> <li>Fever and chills</li> <li>Rash</li> <li>Severe headache</li> <li>Muscle pain</li> <li>Nausea, vomiting, abdominal pain</li> <li>Red eyes</li> </ul>	<p><b>Maculopapular</b> rash contains both flat discolored areas of skin and small raised bumps that expand over time. Occurs 2-5 days after fever onset, does not occur in up to 10% of people.</p> <p>Later, rash might evolve to <b>petechiae</b> (pinpoint-sized red dots under the surface of the skin).</p>	<p>Maculopapular rash often begins at the extremities, including palms and soles between days 3-5, then makes its way centrally towards the body's trunk.</p> <p>Disease transmission can occur in as little as 4-6 hours after tick attaches.</p> <p>Treatable with doxycycline.</p>
<b>Anaplasmosis</b> ( <i>Anaplasma phagocytophilum</i> )	<i>Ixodes scapularis</i> (Blacklegged tick)	7-14 days	<ul style="list-style-type: none"> <li>Fever and chills</li> <li>Headache</li> <li>Malaise and muscle aches</li> <li>Other signs may include nausea, abdominal pain, cough, confusion</li> </ul>	<p>Rare</p>	<p>Serious illness that can be fatal if not treated early.</p> <p>Treatable with doxycycline.</p>

<b>Ehrlichiosis</b> ( <i>Ehrlichia chaffeensis</i> )	<i>Amblyomma americanum</i> (Lone Star tick)	7-14 days	<ul style="list-style-type: none"> <li>Fever and chills</li> <li>Headache</li> <li>Malaise and muscle aches</li> <li>Other signs may include nausea, vomiting, diarrhea, red eyes, confusion and occasionally rash</li> </ul>	Rash in <30% of adults and ~60% of children	Treatable with doxycycline.
<b>Babesiosis</b> ( <i>Babesia microti</i> )	<i>Ixodes scapularis</i> (Blacklegged tick)	1-8 weeks	<ul style="list-style-type: none"> <li>Fever (may come and go)</li> <li>Chills and sweats</li> <li>Headache</li> <li>Body ache</li> <li>Nausea</li> <li>Fatigue</li> </ul>	None	Possible intermittent fever.  Treatable with a combination of antibiotics and other drugs.  Some infected people may have no symptoms.
<b>Tularemia</b> ( <i>Francisella tularensis</i> )	<i>Dermacentor variabilis</i> (American dog tick)  <i>Amblyomma americanum</i> (Lone Star tick)  Deer flies	On average 3-5 days, but can vary from 1-21 days	<ul style="list-style-type: none"> <li>Fever and chills</li> <li>Headache</li> <li>Muscle pain and joint stiffness</li> <li>Lymph node swelling</li> <li>Pneumonia</li> <li>Ulcerative lesion at site of bite or wound</li> </ul>	None	Other routes of infection include contact with blood or tissue of infected animals, especially rabbits.  Symptoms vary depending on the route of exposure.  Treatable with antibiotics.
<b>Deer tick virus</b> or <b>Powassan Encephalitis</b> ( <i>Flavivirus</i> )	<i>Ixodes scapularis</i> (Blacklegged tick)  <i>Ixodes cookei</i> (Woodchuck tick)	1-4 weeks	<ul style="list-style-type: none"> <li>Fever and chills</li> <li>Headache</li> <li>Nausea, vomiting</li> <li>Altered mental status, seizures, weakness and movement disorders</li> <li>Nerve paralysis (facial muscles)</li> </ul>	None	Usually begins as a febrile illness, and may progress to meningo-encephalitis (inflammation of the membrane of the brain).  No specific anti-viral therapy is available, treatment is supportive.
<b>Disease</b>	<b>Arthropod Vector</b> (in Michigan)	<b>Incubation Time</b>	<b>Signs &amp; Symptoms</b>	<b>Rash Appearance</b>	<b>Comments</b>

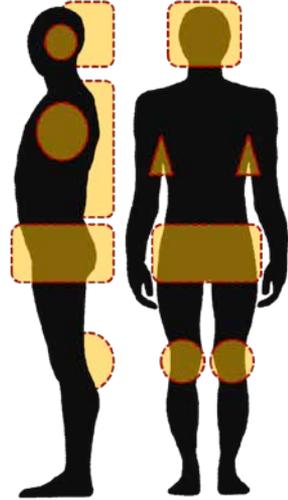
# Prevention

## Avoid areas with a lot of ticks

- Ticks generally prefer shady, moist areas in wooded and grassy locations. Be extra vigilant in warmer months (April-September) when ticks are most active.
- When recreating or working in areas with ticks, try to stay on well groomed trails and avoid contact with overgrown grass, brush and leaf litter.

## Check your skin and clothes for ticks every day

- Wear light-colored clothing so ticks can be spotted easily.
- Perform daily tick checks after being outdoors, even in your own yard. Use a hand-held or full-length mirror to inspect all parts of your body carefully, including your armpits, scalp, and groin.
- Shower promptly after coming indoors to wash off and more easily find ticks.
- Remove ticks from your clothes before going indoors. To kill ticks that you may have missed, place clothing in a dryer on high heat for at least one hour.



Areas of the body where ticks will commonly bite and attach.

## Use of insect repellents

- Insect repellents have been shown to be effective for repelling ticks and can be applied to clothing and skin –
  - Environmental Protection Agency (EPA) approved repellents registered for ticks include products containing:
    - DEET
    - Picaridin
    - Oil of Lemon Eucalyptus



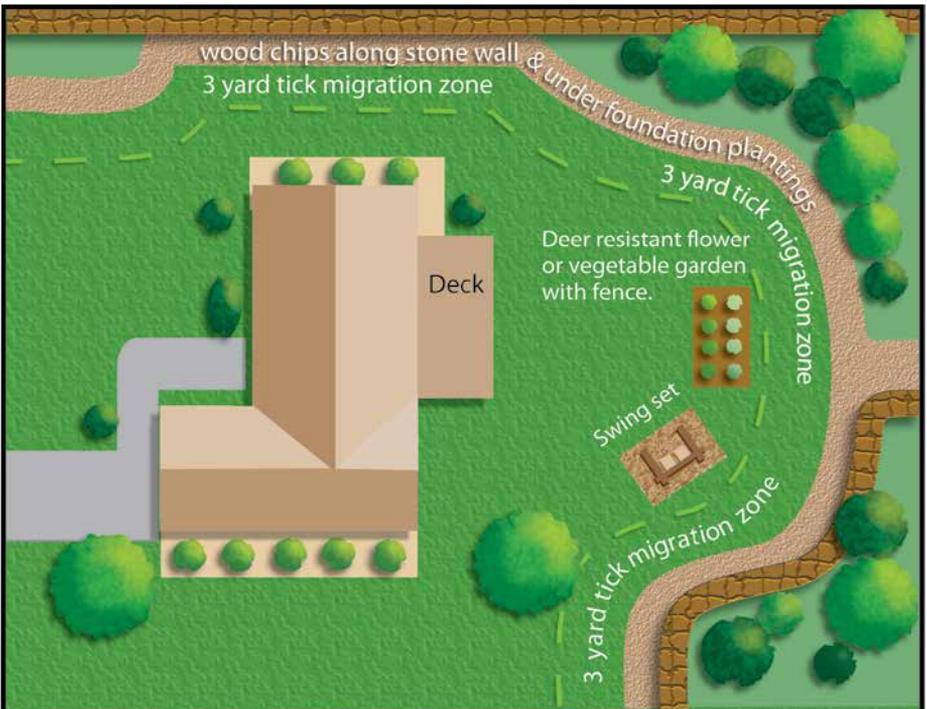
- Store away from children, and follow label guidelines for proper application.
- Do NOT apply repellents directly to children. Apply to your own hands and then put it on the child, avoiding the hands, eyes, nose and mouth.

- Permethrin is another type of repellent. Permethrin kills ticks on contact. Some permethrin products are labeled for application to clothing. Such products once applied will stay effective as a repellent to ticks following several washings. Permethrin should NOT be applied directly to skin.
- Whenever using an insect repellent, always read and follow the label use directions for proper application and safety concerns.

### Ways to keep your home tick free

If your home is bordered by grassy or wooded areas with abundant wildlife, including deer and small mammals, there are several ways you can create a “tick safe zone” around your residence. Wildlife and ticks need moist, shaded places to live and hide while they’re not searching for food. Keeping these areas separated from your lawn or recreation areas and reducing clutter around your home can help reduce the number of ticks dramatically. While it’s not always possible to keep all ticks away, the following recommendations will help reduce tick populations around the home:

### Landscaping Considerations for Tick Prevention



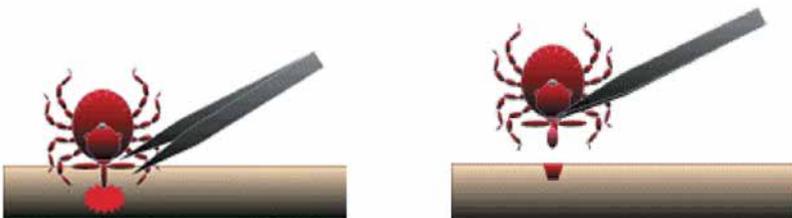
- Keep grass mowed
- Remove leaf litter, brush and weeds at the edge of the lawn
- Maintain wood piles and bird feeders away from the home if possible
- Clean up and seal small openings around the home and garages or sheds, this will reduce rodent activity
- Keeping dogs and cats out of wooded and grassy areas will reduce ticks brought into the home by pets
- Move swing sets and sand boxes away from the woodland edge and place them on a wood chip or mulch foundation
- Trim shrubbery and tree branches around the yard to let in more sunlight
- A well sunlit three-foot wide barrier of wood chips, mulch, or gravel between lawns and wooded or shrubby/grassy areas will help to keep ticks from surviving or reaching the yard
- Pesticides can be applied as targeted treatments to reduce tick populations or create a barrier for the yard. Do not use pesticides near streams or any body of water, and **always follow the label directions**

## Tick Removal

Ticks can attach to any part of the human body, but prefer body creases and areas with hair such as the groin, armpit, ankle and scalp.

**To remove attached ticks, use the following procedure:**

1. Using fine-tipped tweezers or a tick removal tool, grasp the tick as close to the skin as possible then slowly, but firmly, pull it straight out. Do not twist or jerk the tick, apply petroleum jelly, a hot match, or other irritants. This can lead to a skin infection because the tick's mouth parts may remain embedded, or you may be burned. Use your fingernails and tissue paper if tweezers are not available.
2. Immediately wash the bite area and your hands with soap and water then apply an antiseptic to the bite wound.



## Tick Identification and Testing

Expert tick identification is available through the Michigan Department of Health and Human Services. Place the tick in a small vial containing a damp piece of tissue or piece of grass and submit it by following the guidelines for tick identification and testing found at: [www.michigan.gov/lyme](http://www.michigan.gov/lyme).

This service is free to the public for ticks removed from residents in Michigan.

## Tick Prevention in Pets

Animals may become sick with the same tick-borne diseases that affect people. Tick prevention for your pets is very similar to prevention for people and the best way to prevent ticks from attaching to your pets is the combined use of topical pest repellents as well as frequent body checks.



Visual and hands-on inspections are especially important to make sure a tick is not hidden in the fur.

- Make sure to run your hands over the animal's body with sufficient pressure to feel any bumps.
- Be sure to check around the animal's ears, chest, underbelly, legs, feet (including between the toes) and tail.
- Try to avoid wooded or grassy areas when walking your pet.
- A vaccination for Lyme disease should be considered for dogs that live in endemic areas.

There are a number of topical and systemic repellents that can be used in pets to prevent tick and flea infestations. Discuss with your veterinarian the best options for tick prevention for your pet.

If a tick is found on your animal, use the same method outlined above for tick removal from people.

### ***Diagnosis and treatment of Lyme disease in pets***

If your pet displays signs of illness following an exposure to ticks, be sure to alert your veterinarian.

## Ticks and Wildlife

Many species of wildlife, including small mammals and white-tailed deer in Michigan can harbor ticks. Wildlife are the natural hosts for ticks and do not normally show signs of illness due to tick-borne disease. Be aware of ticks on wildlife, as they may find their way onto people or pets. Importantly, hunters and outdoor enthusiasts are not at risk of contracting a tick-borne disease from directly handling (ie. field-dressing a harvested animal) or eating properly cooked game species. **There is, however, one exception:** Hunters and trappers handling rabbits, hares, beavers, and muskrat may be at risk of contracting tularemia from the blood or tissues of infected animals if exposed through cuts and abrasions in the skin or through mucous membranes such as the eyes or nose.

It is always important when skinning/cleaning carcasses to wear gloves, and practice good hand hygiene after handling carcasses. The reason for this is that there are bacteria present on the carcass or in the bodily fluids of wild animals that may cause infection.



## **Additional Information**

For information regarding specific questions about the effects of these tick borne illnesses on human health, wildlife, or domestic animals, visit the Centers for Disease Control and Prevention website at [www.cdc.gov](http://www.cdc.gov) or consult one of the agencies listed below:

### **Michigan Department of Health & Human Services**

Bureau of Epidemiology and Population Health

517-335-8165

333 South Grand Ave., 3rd Floor

Lansing, MI 48933

[www.michigan.gov/mdhhs](http://www.michigan.gov/mdhhs)

[www.michigan.gov/lyme](http://www.michigan.gov/lyme)

### **Michigan Department of Natural Resources**

Wildlife Disease Laboratory

517-336-5030

4125 Beaumont Rd., Rm 250

Lansing, MI 48910

[www.michigan.gov/dnr](http://www.michigan.gov/dnr)

### **Michigan State University**

Department of Fisheries and Wildlife

480 Wilson Rd.

East Lansing, MI 48824

MDHHS is an Equal Opportunity Employer, Services, and Programs Provider

This publication was supported by Cooperative Agreement Number 3U50CK000369-01S1 from the Centers for Disease Control and Prevention (CDC), and was not paid for with state funds.

[www.michigan.gov/lyme](http://www.michigan.gov/lyme)



**Images in this brochure courtesy of:**

Kent Loeffler, Dept. of Plant Pathology & Plant-Microbe Biology, Cornell University  
Kirby Stafford, Connecticut Agricultural Experiment Station  
John Aucott, John Hopkins University  
Graham Hickling, University of Tennessee  
Jean Tsao, Michigan State University