

# VECTORBORNE DISEASE TOOLKIT

A planning guide for public health and  
emergency response professionals

**WISCONSIN CLIMATE AND HEALTH PROGRAM**  
Bureau of Environmental and Occupational Health

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State of Wisconsin | Department of Health Services | Division of Public Health | P-01109 (Rev. 04/2019)



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# INTRODUCTION

## Purpose

The purpose of this toolkit is to provide information to local governments, health departments, and citizens in Wisconsin to prepare for and respond to vectorborne disease. The toolkit focuses on background information for Wisconsin and practical guidance, strategies, media releases, talking points, definitions, and useful reference materials related to vectorborne disease.

The guides in this toolkit may be copied onto agency letterhead for distribution to residents in your region affected by vectorborne diseases. Additional documents may be found in Appendix B: Additional Resources.

## Background

Over the last 60 years, Wisconsin's weather has generally been getting warmer and wetter.<sup>1</sup> The natural environment can change as our climate is projected to continue changing, and this can have an impact on the behaviors and distribution of vectors. A vector is a pathogen's temporary home until it transmits disease between the original host and the end host. Vectors can be especially sensitive to temperature changes.<sup>4</sup> Certain species of Wisconsin mosquitoes and ticks can transmit mosquito-borne and tick-borne diseases. The warmer, wetter conditions in Wisconsin can affect the rate of reproduction of mosquitoes and ticks and potentially increase transmission of vectorborne disease, especially during warm weather months.<sup>2</sup>

**Warmer, wetter conditions can potentially increase transmission of vectorborne disease.**

Late spring through fall is the peak disease transmission time for Wisconsin vectors such as the blacklegged tick (commonly known as the deer tick).<sup>3</sup> Ticks can be found in tall grass and wooded areas. Deer ticks are known vectors for Lyme disease and anaplasmosis, the most common vectorborne diseases found in Wisconsin. Most common mosquito species in Wisconsin are not prone to carrying diseases; however, some mosquito species in Wisconsin can transmit West Nile virus (WNV) and several encephalitis pathogens.

## Climate Trends

Long-term trend analysis of Wisconsin's climate indicates that the state is becoming warmer and wetter.<sup>1</sup> Wisconsin has experienced an increase in average annual precipitation, a longer growing season, and warmer annual average temperatures. The warmer weather allows the range of ticks and mosquitoes to expand north, which affects Wisconsin.<sup>4</sup>

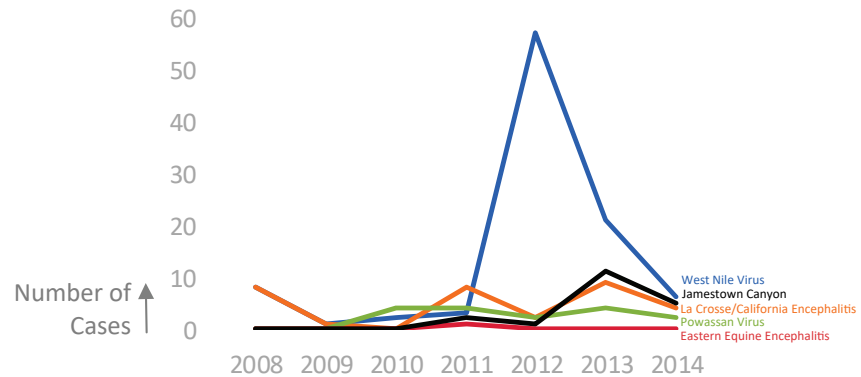
Increased temperatures in Wisconsin have important implications for vectorborne disease; studies have found a correlation between increased temperatures and increased vectorborne diseases.<sup>2,4,5</sup> A warmer and wetter climate alters the habitats of vectors. Increases in precipitation can lead to increased breeding grounds and a wider distribution of arthropod vectors. Inclement weather patterns alter the life cycle of arthropod vectors. This can lead to a quicker

maturation of larvae in warmer and wetter environments, like those found in Wisconsin.<sup>6</sup>

In contrast to the warm and wet environment, extreme heat that causes drought can have the opposite effect on vectorborne diseases. Dry heat and low moisture can lead to a decrease in disease transmission rates for ticks due to their sensitivity and continuous exposure to elevated temperatures.

In the extreme heat experienced during the summer of 2012, an increased transmission of West Nile virus (WNV) disease occurred.<sup>5</sup> Dry heat and low amounts of moisture can lead to increased transmission of disease by strong vectors that can flourish in these conditions. This spike may be due to the reduced activity of other common nuisance mosquitoes. Those nuisance mosquitoes may have been too sensitive to endure the temperatures, and their absence may have affected the protective behavior of the population, reducing the use of protective repellents.

Reported Arboviral Diseases in Wisconsin



## Health Impacts

Public health officials should prepare for a possible increase in vector activity and vectorborne diseases. During times of high vector activity, people need to be aware of the health risks associated with time spent outside, whether through work or recreation. Hikers, campers, and residents of areas with heavy tick and mosquito activity need to be aware of the illnesses associated with tickborne and mosquitoborne disease transmission.

Tickborne bacterial illnesses include Lyme disease, anaplasmosis, and ehrlichiosis. Lyme disease is the most common tickborne disease and is primarily found in the northwestern part of Wisconsin, but cases occur in all counties. Common initial symptoms of these tickborne diseases include fever, chills, muscle and joint aches, tiredness, headache, redness or rash at the bite location, and swollen lymph nodes.<sup>7</sup>

Arboviruses are viruses transmitted by arthropods such as mosquitoes and ticks. In Wisconsin, the most commonly reported arboviral diseases are West Nile virus and La Crosse encephalitis infections and the less common reported arboviral illnesses are Jamestown Canyon and Powassan virus infections. Symptoms of arboviral diseases include fever, headache, body aches, joint pain, vomiting, diarrhea, rash, and lethargy.<sup>8</sup> In the case of severe arboviral infections, symptoms can include encephalitis (swelling of the brain), seizures, coma, paralysis, and meningoencephalitis (swelling of the meninges).<sup>5</sup>

Preventive measures can help protect health, including use of recommended insect repellents with DEET and permethrin. See Guide 7 for more information.

## Vectorborne Disease Response and Recovery Guidance

The Wisconsin Electronic Disease Surveillance System (WEDSS) is one data source among several used to monitor vector-related communicable diseases in Wisconsin. WEDSS is an online system used by health care professionals, public health professionals, infectious disease professionals, clinical laboratories, and other professionals who report disease infection. This system was developed to create easy access for disease surveillance programs to document diseases in their jurisdiction.

# DEFINITIONS

## **Disease Vector**

A living intermediary (person, animal, or microorganism) that may carry and transmit disease-causing pathogens (e.g., viruses, bacteria) from one susceptible host to another.

## **Zoonotic Disease**

A disease that can normally exist in animals and be transmitted from animals to people.

## **Asymptomatic Carrier**

A living intermediary (person, animal, or microorganism) that has contracted an infectious disease but does not exhibit symptoms.

## **Tickborne Diseases**

Diseases that are transmitted by a tick.

## **Mosquitoborne Diseases**

Diseases that are transmitted by mosquitoes.

## **Arboviral Diseases**

Short for arthropod-borne. Diseases transmitted by an arthropod such as a mosquito or tick.

## **Pathogen**

An organism (e.g., virus, bacterium) that may lead to disease.

## **Host**

An animal infected or infested by disease that may become ill from the disease.

## **Reservoir**

An animal that can carry a disease without being infected by the disease.



# TICKS IN WISCONSIN

There are at least 16 reported species of ticks in Wisconsin, only a few of which feed on humans.<sup>10</sup> The most commonly encountered ticks in Wisconsin for tickborne diseases are the blacklegged tick (commonly known as the deer tick), and the American dog (wood) tick. Ticks are vectors and can carry pathogens that cause diseases such as Lyme disease, human anaplasmosis, ehrlichiosis, babesiosis, and Powassan virus.<sup>11</sup>



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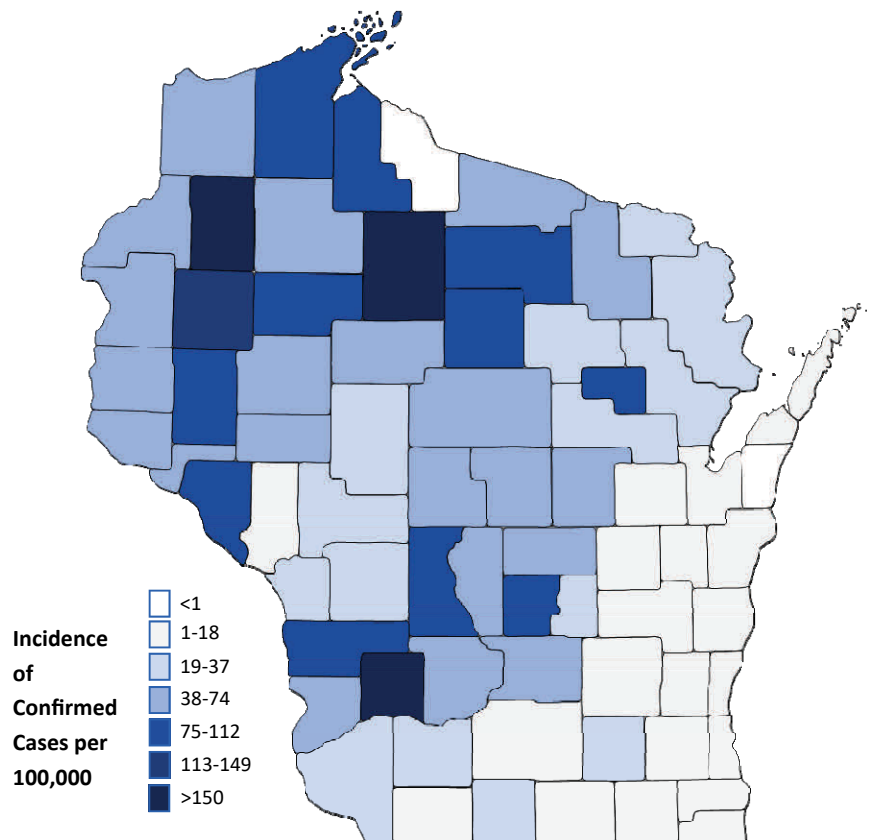
# LYME DISEASE

In Wisconsin, the statewide average incidence of Lyme disease has increased more than fivefold in the past 19 years, from an average of 8.0 confirmed cases per 100,000 people (1991-1995) to 41.8 confirmed cases per 100,000 people (in 2011). Wisconsin's rate for both confirmed and probable cases of Lyme disease in 2011 was 61.8 cases per 100,000 people.<sup>12</sup>

## The Facts

- Lyme disease is caused by the bacteria *Borrelia burgdorferi*.
- Transmission of Lyme disease occurs when a female or nymphal tick attach to a host to take a blood meal.
- A blacklegged (deer) tick must be attached for at least 24 hours but averages 36-48 hours before the bacteria can be transmitted.

**FIGURE 1. Wisconsin Lyme Disease Annual Incidence, 2015**



Revised 4/12/2016

Statewide incidence = 22.6/100,000

This map is based on the county of residence of confirmed cases. Some infections may have been acquired during travel to other areas.

**Data source:** Wisconsin Division of Public Health



## Clinical Signs

- **Stage 1:** Appears 3-30 days after tick bite. Symptoms may include:
  - Red, expanding erythema migrans (EM) rash at the site of the tick bite. An EM rash slowly expands outwards.
  - EM rash is being seen more commonly than a “bull’s eye” rash. Experts in the field are referring to EM rash rather than “bull’s-eye” rash.
  - Fever, chills, muscle and joint aches, tiredness, headache, and swollen lymph nodes.
- **Stage 2:** Early, disseminated stage that occurs days to weeks post-tick bite. Symptoms may include:
  - Additional bull’s-eye or EM rashes in other areas of the body
  - Loss of muscle tone on one or both sides of the face
  - Severe headaches, stiffness of the neck due to inflammation of the spinal cord (meningitis)
  - Pain and swelling of large joints
  - Dizziness or heart palpitations
- **Stage 3:** Can occur months to years after the tick bite, and can become a severe problem if not treated. Symptoms may include:
  - Chronic fatigue
  - Joint and muscle pain
  - Neurological and cognitive defects
  - Irregular heartbeat

## Treatment

- Once acquired, Lyme disease can be treated effectively with antibiotics if treated early in the infection.
- Approximately 10%-20% of patients experience symptoms that last months to years after antibiotic treatment. This is called post-treatment Lyme disease syndrome (PTLDS) or commonly referred to as chronic Lyme disease, and its direct cause is unknown and further studies are being conducted to better understand this syndrome. Most patients have reduced symptoms over time.



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# ANAPLASMOSIS

Anaplasmosis is a rickettsial infection, the second highest reported tickborne disease in Wisconsin. Anaplasmosis is caused by the bacterium *Anaplasma phagocytophilum* through the bite of an infected tick. This disease was previously known as human granulocytic ehrlichiosis (HGE). Antibiotic treatment is available for anaplasmosis.<sup>7,13</sup>

## The Facts

- Anaplasmosis is an illness caused by the bacterium *Anaplasma phagocytophilum*.
- Anaplasmosis is primarily transmitted through a bite from the blacklegged (deer) tick.
- To transfer the bacteria, the tick must be attached for at least 12-24 hours.
- Anaplasmosis is the second most reported tickborne disease in Wisconsin.

## Clinical Signs

In humans, symptoms of anaplasmosis typically begin one to three weeks after being bitten by a tick infected with the bacteria.

Blood tests may not always identify the presence of the bacteria, and false negatives can occur. Treatment should continue for a suspected case. Symptoms may include:

- Fever
- Headache
- Muscle pain
- Malaise
- Chills
- Nausea/ abdominal pain
- Cough
- Confusion

## Treatment

Anaplasmosis can be treated with antibiotics; this disease is caused by bacteria and is therefore treatable with antibacterial medications.



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# EHRlichiosis

Ehrlichiosis is an illness caused by several species of the bacteria *Ehrlichia* (*E. chaffeensis*, *E. ewingii* and *E. muris-like*). Ehrlichiosis can be more severe than anaplasmosis, and some people may have respiratory and renal complications causing serious illness. The number of reported ehrlichiosis cases is much lower than the number of anaplasmosis cases in Wisconsin.<sup>7</sup>

## The Facts

- To transmit the bacteria, the tick must be attached for 12-24 hours.
- Ehrlichiosis is less common than anaplasmosis. *E. muris-like* (EML) bacteria were discovered in 2009 in Wisconsin and Minnesota.
- *E. chaffeensis* is rare but has occurred in Wisconsin.
- *E. ewingii* commonly occurs in southern states where lone star tick is abundant.

## Clinical Signs

In humans, illness usually occurs five to ten days after being bitten by a blacklegged (deer) tick infected with the bacteria. Symptoms may include:

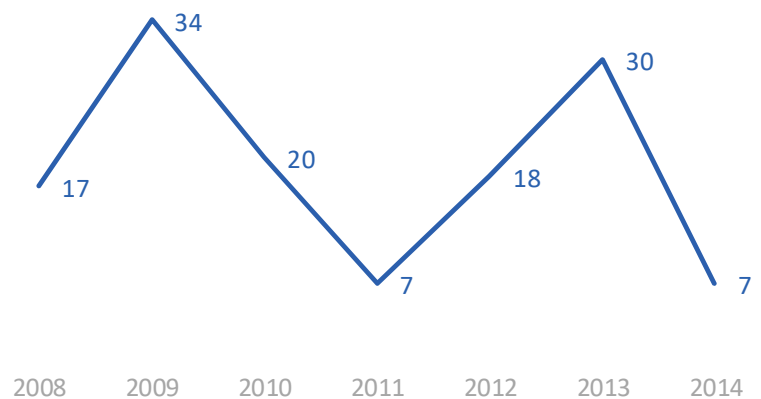
- Fever
- Severe headache
- Muscle pain
- Chills
- Fatigue
- Nausea
- Vomiting
- Diarrhea
- Joint pain
- Confusion
- Rash (found in 60% of children and less than 30% of adults)

Clinical laboratory findings may include low blood count, low white blood cell count, and elevated liver enzymes.

## Treatment

This disease is caused by bacteria and is therefore treatable with antibacterial medications.

Reported Total Cases of *Ehrlichia chaffeensis* in Wisconsin  
Confirmed and probable by year of illness onset



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# BABESIOSIS

Babesiosis cases have increased greatly in the past few years, with most occurrences being reported since 2011. Due to the severity of the infection, hospitalization is common in patients infected with babesiosis; 47% of babesiosis cases from 2011-2014 were hospitalized.

## Facts

- Babesiosis is a disease caused by the parasite *Babesia*.
- The disease occurs primarily in the upper Midwest and northeastern states.
- The blacklegged (deer) tick is the most common vector for babesiosis.
- In rare instances, the infection has been acquired through blood transfusions.

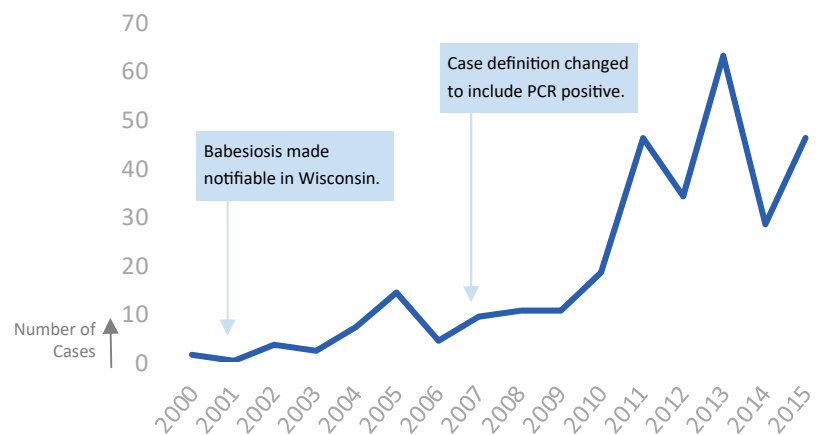
## Clinical Signs

Symptoms of babesiosis tend to be more apparent and severe in the elderly population or in people with compromised immune systems. Symptoms may include fever, fatigue, and anemia (which can last from several days to several months). Infections can also occur without producing symptoms.

## Treatment

The use of antibiotics, combined with certain drugs used in the treatment of malaria, has been found to be effective in some patients with babesiosis.

Reported Confirmed Cases of Babesiosis in Wisconsin



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# POWASSAN VIRUS

Powassan virus (POWV) is a rare tickborne arboviral infection. POWV is the only tickborne virus that is part of the arbovirus group. The presence of POWV has been documented in several tick species (*Ixodes spp.*, *Dermacentor andersoni*).<sup>3,5</sup>

## The Facts

- POWV is the only known arbovirus in ticks occurring in Wisconsin.
- POWV infections may occur after a bite from an infected blacklegged tick.
- Cases of POWV:
  - 60 total U.S. cases in 2004-2013.
  - 19 total Wisconsin reported cases in 2003-2014.

## Clinical Signs

The incubation period is from one week to one month. The disease may have no apparent symptoms. Symptoms may include:

### Acute Symptoms:

- Fever
- Muscle weakness
- Confusion
- Headache
- Nausea
- Vomiting
- Stiff neck

### Severe Symptoms:

- Confusion
- Paralysis
- Speech difficulties
- Memory loss
- Meningoencephalitis (inflammation of the brain and meninges)

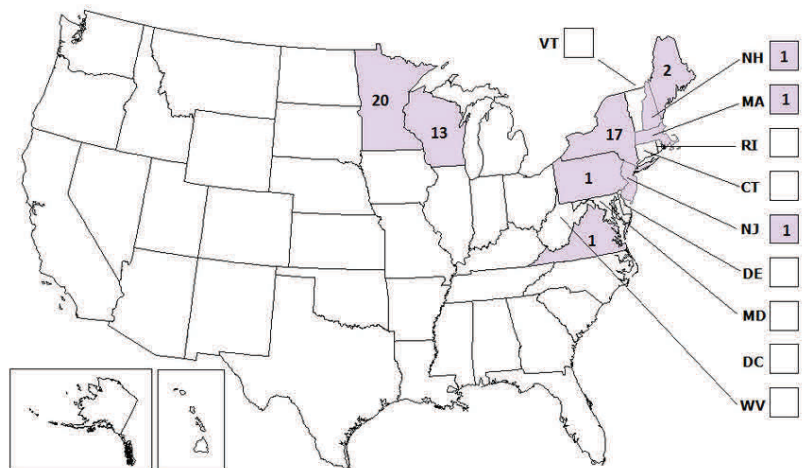
## Treatment

There is no commercial test for viral detection of POWV; it can be tested at the U.S. Centers for Disease Control and Prevention.

There is no treatment at this time other than supportive care.

### Powassan Cases by State (2004-2013)

Centers for Disease Control and Prevention



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# TICK PREVENTION AND CONTROL

Although some effective therapies are available for Lyme disease and other tickborne diseases, preventative measures remain the best approach. Ticks are most active during the warmer months of the year. In Wisconsin, preventive measures are especially needed during the months of April through October.<sup>11,15</sup>

People spending time outdoors include campers, anglers, hikers, hunters, farmers, and people in outdoor occupations; they may be more likely to encounter ticks and therefore are at a higher risk of acquiring tickborne diseases.

## Personal Protection

### Repellents

Use effective tick repellents and apply according to the label instructions. The Centers for Disease Control and Prevention recommends that adults use repellents with 20%-30% DEET on exposed skin and clothing to prevent tick bites. Permethrin is also effective against ticks and lasts for days to weeks, but should only be applied to clothes and **not** directly to the skin.

### Clothing

Wear long sleeves, long pants, and long socks to keep ticks on the outside of clothing. Light colored clothing will help you spot ticks. Tuck shirts into pants and pants into shoes or socks. If you are outdoors for an extended period of time, tape pants legs where pants and socks meet so that ticks cannot crawl under clothes.

### Tick Avoidance

If possible, avoid wooded and bushy areas that contain high grass and leaf litter.

If you do go into wooded areas, stay in the center of a cleared trail to avoid contact with overgrown grass, brush, and leaf litter.

To help control the spread of infection from ticks, maintain the vegetation around your home. Take precautions to avoid ticks by reducing areas with high, tall grass surrounding your home. Ticks are commonly found in these areas.

## Tick Control

- Clear overgrown grass, brush, and leaf litter from the premises or trails.
- Use wood chips or gravel as a barrier between lawns and wooded areas.
- Mow lawns frequently and remove cut grass and leaves.
- Keep tables, swing sets, play equipment, etc., away from woods, shrubs, and tall grass. Place in a sunny location, if possible.
- Discourage deer intrusion by constructing barriers and not feeding them.
- Remove woodpiles, or stack wood neatly in dry areas away from houses to prevent rodent harborage.
- Acaracides (pesticides that kill ticks) may be helpful to use during spring, but a professional pesticide company should be consulted prior to use.
- Apply pesticides outdoors to control ticks. For more information, visit the Environmental Protection Agency's Pesticide Safety site (Appendix B).
- The Environmental Protection Agency and each state have different rules and regulations related to pesticide application on residential properties; identify these before pesticide application.
- Consider hiring a professional pesticide company.

## Body Check and Tick Removal

Check your body for ticks after being outdoors. Inspect all body parts carefully, especially the armpits, scalp, and groin. Remove any ticks from clothing, gear, and pets before going inside.

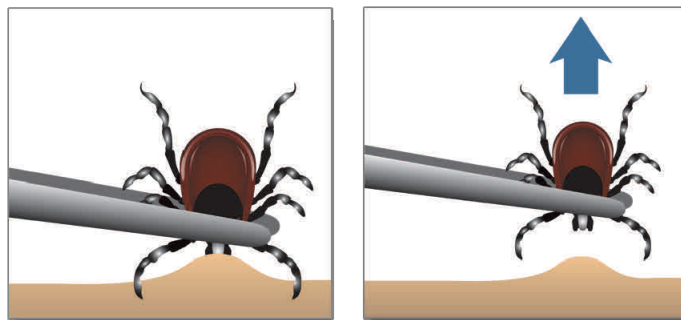
Take a shower or bath as soon as possible to wash off any ticks that still might be on your body. Tumble clothes in a dryer on high heat for an hour to kill remaining ticks.

### To remove an attached tick:

- Grasp it with narrow-bladed tweezers or forceps as close as possible to attachment (skin) site.
- Pull upward and out with a firm and steady tension. If tweezers are not available, use fingers shielded with tissue paper or rubber gloves. Do not handle the tick with bare hands. Be careful not to squeeze, crush, or puncture the tick, as it may contain infectious fluids.
- After removing the tick, thoroughly disinfect the bite site, and wash hands.
- 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—not wait for it to detach.

If you develop a rash or fever and other symptoms described above within several weeks of removing a tick, see your doctor. Be sure to tell the doctor about your recent tick bite, when the bite occurred, and where you most likely acquired the tick.

### HOW TO REMOVE A TICK Centers for Disease Control and Prevention



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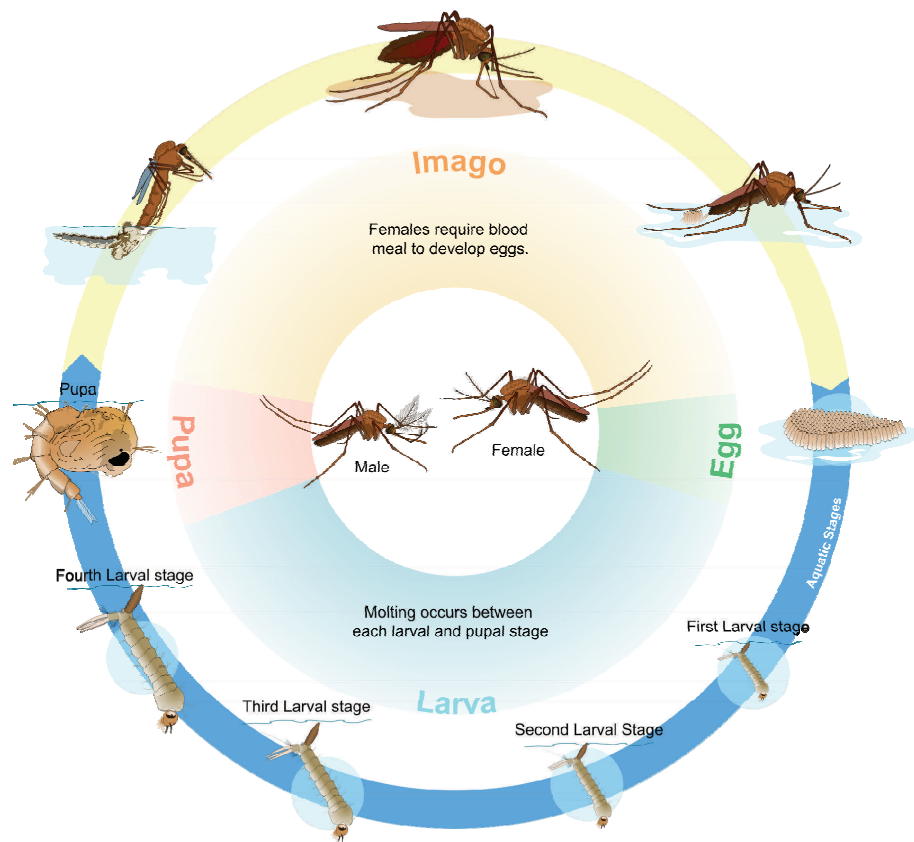
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# MOSQUITOES IN WISCONSIN

Mosquitoes are vectors that can transmit an arbovirus (an arthropodborne virus).<sup>5</sup> Most mosquitoes don't carry arboviruses, but those that do can infect with a bite. Many of the associated diseases can be prevented by the elimination of standing and stagnant water sources. Arboviral infections commonly reported in Wisconsin are West Nile virus (WNV), California encephalitis (CA), La Crosse encephalitis (LAC), and Jamestown Canyon (JC).<sup>5</sup>



Species: *Aedes*  
Diseases include: LAC, CA, JC



Species: *Anopheles*  
Diseases include: JC



Species: *Culex*  
Diseases include: WNV



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# WEST NILE VIRUS

The first case of West Nile Virus (WNV) in the United States occurred in 1999 and human cases of WNV have been detected and investigated in Wisconsin since 2002.<sup>8</sup> There have been 98 cases of WNV reported in Wisconsin during the years 2007-2014. The risk of WNV infection increases during summer, even during times of extreme dry heat and drought. Risk of infection is higher for those who work outdoors or spend a lot of time outdoors. Resilient species of mosquitoes, such as the *Culex*, a predominant carrier of WNV, can survive and thrive in very small amounts of stagnant water.

## The Facts

- WNV infection is an illness caused by the *Flavivirus*.
- WNV is primarily transmitted through a bite from an infected mosquito of the species *Culex*.

## Clinical Signs

- Of infected people, 70%-80% do not show signs or symptoms of the infection.
- In humans, symptoms of WNV typically begin 3-14 days after being bitten by a mosquito infected with the virus.
- Less than 1% of people with WNV become severely ill. One in five people who contract WNV may develop symptoms of:
  - Fever
  - Headache
  - Body aches
  - Joint pain
  - Vomiting
  - Diarrhea
  - Rash

## Treatment

- There is no specific medication for WNV infections other than use of supportive treatment.
- No vaccine is available.
- Infection may provide lifelong immunity.



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# OTHER ARBOVIRAL INFECTIONS

Encephalitis is an acute inflammation of the brain that can be caused by an arbovirus. In Wisconsin, several types of mosquito-borne arboviruses can cause encephalitis, with two main California serogroup viruses: La Crosse encephalitis (LAC) and Jamestown Canyon (JC).<sup>5</sup> These serogroups are part of the viral family Bunyaviridae. LAC is most likely to be the cause of an encephalitis-related case, compared to other serogroups.

## The Facts

- Arboviral encephalitis is swelling of the brain caused by severe symptoms from California serogroup viruses such as La Crosse and Jamestown Canyon viruses.
- A total of 51 California serogroup cases occurred in Wisconsin during 2008-2014.
- LAC: Its first case was identified in a Minnesota resident that was treated and died in La Crosse, Wisconsin. Subsequently, it was first identified in Wisconsin residents in 1963 in children from La Crosse, Wisconsin. A total of 68 cases with an average of 10 cases per year occurred from 2002 to 2008.
- JC: 19 confirmed cases from 2011-2014.

## Clinical Signs

The incubation period is 5-15 days. Some people may have no apparent symptoms. Symptoms may include:

### Acute Symptoms

- Fever
- Headache
- Nausea
- Vomiting
- Tiredness

### Severe Symptoms:

- Encephalitis
- Seizures
- Coma
- Paralysis
- Meningoencephalitis

## Treatment

- There is no commercial test for viral detection of LAC or JC virus, but they can be tested at the CDC.
- No vaccine is available.
- Hospitalization: Supportive treatment should be provided.



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# MOSQUITO PREVENTION AND CONTROL

Use the appropriate mosquito repellent and apply according to the label instructions. It is recommended to use products registered with the Environmental Protection Agency (EPA), which means the product isn't expected to cause adverse effects to human health or the environment when used according to the label.<sup>5</sup>

## Personal Protection

### Repellents

It is recommended to use a strong repellent approved by the EPA. Repellents recommended by the CDC contain permethrin or DEET. These repellents have been studied the most and have proven to offer extra protection.

### Clothing

Wear long-sleeved shirts, long pants, socks, and shoes. Mosquitoes may bite through thin clothing. It is recommended to spray clothes with a reliable repellent such as permethrin.

### Permethrin

This repellent and insecticide used on clothing helps to repel and kill arthropods like mosquitoes. This product has been known to continually repel and kill insects even after several washings. Follow directions when reapplying the product.

Avoid direct skin contact with permethrin. Recommended for use on the following items when directions are followed: clothing, shoes, bed nets, and camping gear.

## Mosquito Prevention

- Avoid being outside during times of high mosquito activity (dawn and dusk).
- Keep window screens repaired so that mosquitoes cannot enter your home.
- Dispose of discarded tires, cans, or plastic containers left outside that may contain standing water.
- Drain standing water from pools or hot tub covers.
- Turn over plastic wading pools and wheelbarrows when not in use.
- Change the water in bird baths, pet dishes, and wading pools at least every 3-4 days.
- Keep drains, ditches, and culverts clean of trash and weeds so water will drain properly.
- Clean gutters to ensure they drain properly.
- For more information on mosquito habitats, visit [dhs.wisconsin.gov/environmental/mosquito-habitat.htm](https://dhs.wisconsin.gov/environmental/mosquito-habitat.htm).



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# Talking Points for Vectorborne Diseases

Talking points and message maps for local health professionals

If you are approached by the media about vectorborne disease in your jurisdiction, the following talking points may be helpful.

1. Blacklegged ticks (also known as deer ticks) can carry bacteria that cause Lyme disease and other diseases.
2. Use an insect repellent approved by the Environmental Protection Agency and follow label instructions.
3. Wear light-colored, protective clothing to better see ticks or mosquitoes.
4. Check yourself for ticks after walking in high grass, heavily wooded areas, and bushy areas with leaf litter.
5. If you find a tick embedded in your skin, remove it immediately to preventing infection by grasping the head with tweezers.
6. Prevent mosquito breeding by draining standing water from gutters, wading pools, and old tires.

**Some additional talking points to include, if applicable:**

7. If you are having symptoms or illness that you think is from an insect bite, contact your doctor [insert correct resource] right away.
8. For more information about ticks and mosquitoes, contact your local health department or visit the Wisconsin Department of Health Services web page on ticks at [dhs.wisconsin.gov/tickborne](https://dhs.wisconsin.gov/tickborne) or mosquitoes at [dhs.wisconsin.gov/arboviral](https://dhs.wisconsin.gov/arboviral).

# MESSAGE MAPS

Message mapping is one of the most important risk communication tools that public health agencies can employ. The goal of a message map is to convey important information in a concise and easy to understand fashion.



## General Guidelines for Completing a Message Map

- Stick to three key messages or one key message with three parts for each underlying concern or specific question.
- Keep key messages brief. The reader should ideally spend less than 10 seconds per line.
- Develop messages that are easily understood by the target audience. (For communications with the general public, use a 6th to 8th grade readability level.)
- Place messages within a message set. The most important messages should occupy the first and last positions.
- Develop key messages that cite credible third parties.
- Use graphics and other visual aids to enhance key messages.
- Keep a positive tone. Messages should be solution-oriented and constructive. Try to balance negative messages with positive ones.
- Avoid unnecessary use of “absolute” words, such as no, not, never, nothing, and none.<sup>5</sup>

The following is a message map that could be used when addressing the general public regarding ticks and mosquitoes.

<b>Key Messages</b> <i>Three key messages</i>	<b>Supporting Information</b> <i>Three pieces of supporting information for each key message</i>
<b>Message 1</b> Be quick and remove that tick.	<b>Supporting Info 1</b> Ticks often found in Wisconsin are the deer tick and the wood tick, which are most active during warm-weather months.  <b>Supporting Info 2</b> The blacklegged (deer) tick must be attached for 12-24 hours before bacteria can be transmitted.  <b>Supporting Info 3</b> If you find a tick burrowed into your skin, remove it immediately with tweezers and be sure the head remains intact.
<b>Message 2</b> Reduce exposure to mosquitoes.	<b>Supporting Info 1</b> Mosquito-borne diseases are rare in Wisconsin, but people should still take steps to prevent being infected.  <b>Supporting Info 2</b> Use insect repellents and avoid being outside at times of high mosquito activity (dawn and dusk).  <b>Supporting Info 3</b> Wear light-colored, loose clothing when doing activities outdoors in dense mosquito areas.
<b>Message 3</b> Keep ticks and mosquitoes away.	<b>Supporting Info 1</b> Avoid areas with high grass and heavily leafy areas where ticks and mosquitoes commonly live.  <b>Supporting Info 2</b> Drain areas with standing water to eliminate mosquito breeding.  <b>Supporting Info 3</b> If in areas with high tick and mosquito activity, wear protective clothing and use repellents with DEET or permethrin (follow product instructions).





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15. Tickborne Diseases of the United States: A Reference Manual for Health Care Providers. (2015). Centers for Disease Control and Prevention (CDC), at <http://www.cdc.gov/lyme/resources/TickborneDiseases.pdf>
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# RESOURCES

## **Wisconsin Department of Health Services (DHS)**

608-266-1120

### **Tickborne Diseases Page**

[www.dhs.wisconsin.gov/tickborne](http://www.dhs.wisconsin.gov/tickborne)

### **Arboviral Diseases Page**

[www.dhs.wisconsin.gov/arboviral](http://www.dhs.wisconsin.gov/arboviral)

### **List of Wisconsin Tribal Health Directors**

[www.dhs.wisconsin.gov/lh-depts/contacts/tribal-health-directors.pdf](http://www.dhs.wisconsin.gov/lh-depts/contacts/tribal-health-directors.pdf)

### **List of Wisconsin Local Health Departments**

[www.dhs.wisconsin.gov/lh-depts/counties.htm](http://www.dhs.wisconsin.gov/lh-depts/counties.htm)

## **Centers for Disease Control and Prevention**

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

## **Illinois Department of Public Health**

[www.idph.state.il.us/envhealth/wnv\\_house/wnv\\_house.htm](http://www.idph.state.il.us/envhealth/wnv_house/wnv_house.htm)

## **Environmental Protection Agency**

[www.epa.gov/mosquitocontrol](http://www.epa.gov/mosquitocontrol)

[www.epa.gov/pets/controlling-fleas-and-ticks-around-your-home](http://www.epa.gov/pets/controlling-fleas-and-ticks-around-your-home)