

Prepared by the
Michigan Department of
Community Health,
Zoonotic Disease and
Special Projects Section

For more information
contact:

Kim Signs, DVM
Zoonotic Disease
Epidemiologist
signsk@michigan.gov

Or

Erik Foster, MS
Medical Entomologist
fostere@michigan.gov

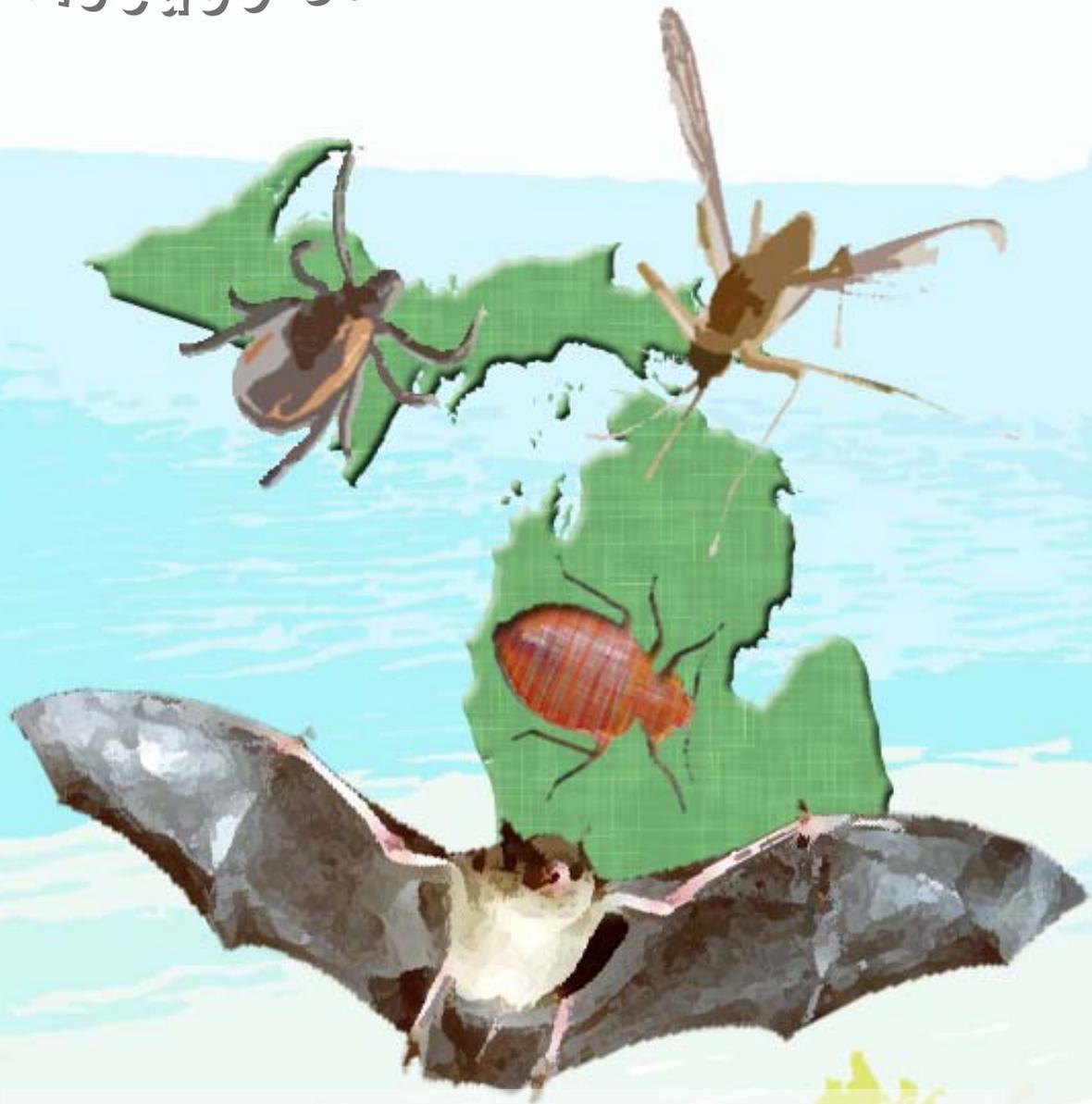
Phone: 517-335-8165
Fax: 517-335-8263

Manager:
Mary Grace Stobierski
DVM, MPH

Online At:
[http://www.michigan.gov/
emergingdiseases](http://www.michigan.gov/emergingdiseases)

MICHIGAN

2009 Zoonotic and Vector-Borne Disease Surveillance Report



CONTENTS

Page 1 – Rabies

Surveillance Report, New ACIP Guidelines, Michigan's First Human Rabies Case in 26 years, Contact Update

Page 6 – West Nile Virus

Surveillance Report, Fight the Bite Campaign

Page 9 – Lyme disease

Surveillance Report, Common MI Ticks, Recreational Camp Recommendations, Updated Pamphlets

Page 14 – Bed Bugs are Back!!

Michigan's Bed Bug Work Group, Epi-Insight Spotlight, Links to Resources

2009 Michigan Rabies Surveillance Report

Summary

Between January 1, 2009 and December 31, 2009, the Michigan Department of Community Health's Bureau of Laboratories (MDCH BOL) received 3,483 specimens for rabies testing, of which 3,373 could be tested. Of these, 65 (1.9%) were positive for rabies. In comparison, in 2008, 3,836 animals were submitted for testing, of which 3,696 could be tested and 79 (2.1%) were positive. Demand for rabies testing has increased in recent years, primarily due to an increase in bats submitted for testing. (See Figure 1)

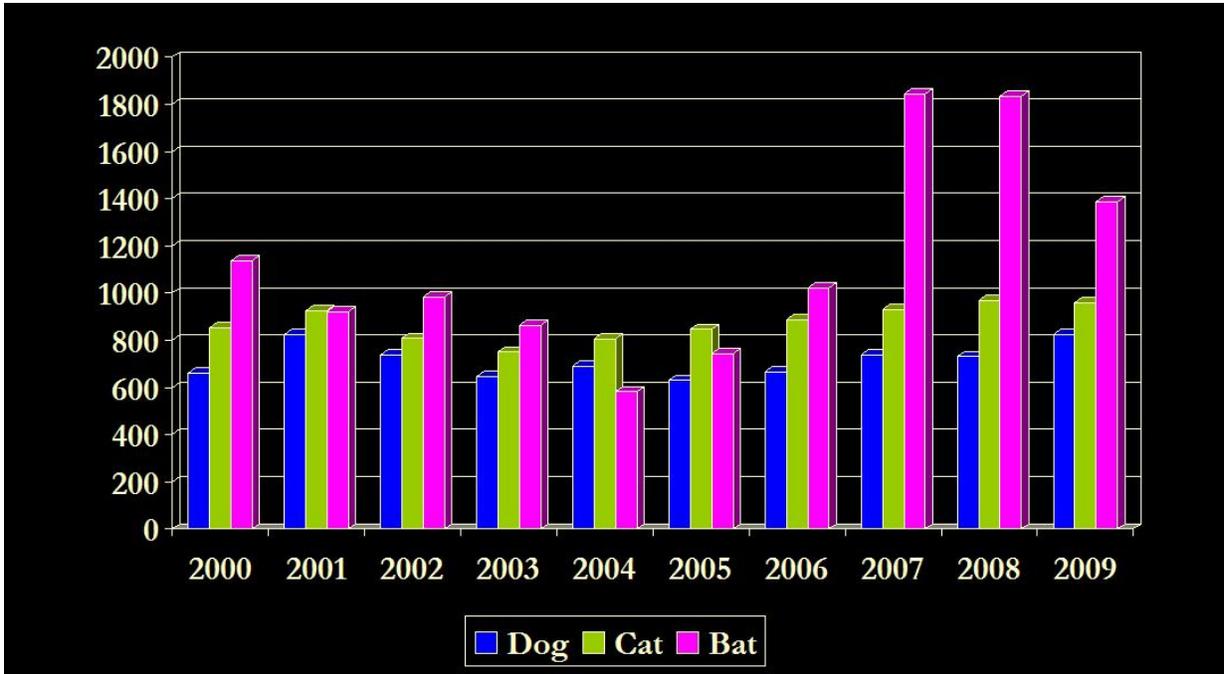


Figure 1: Comparison of the total number of animals submitted for rabies testing by year. Bats, cats and dogs are the species most often submitted to MDCH BOL for rabies testing. The last three years has seen a dramatic increase in the number of bats submitted for rabies testing.

A total of 163 raccoons were submitted for public health testing, with no positive animals identified. An additional 21 animals were tested by the United States Department of Agriculture/Wildlife Services (USDA/WS), including eight raccoons, five skunk, seven fox and one coyote. Of these, one fox and one skunk tested positive for rabies with the north central skunk-strain. Michigan remains free of raccoon-strain rabies, but ongoing surveillance for this strain remains important. In addition to public health testing of raccoons that bite humans and unvaccinated pets, the MDCH BOL is interested in testing unusual-acting raccoons or any that have interacted with vaccinated pets. Health departments and animal control agencies are encouraged to submit these animals for rabies testing.

Rabies Surveillance Summary (Continued)



In 2009, a total of 68 rabid animals were identified in Michigan, including 53 bats, 11 skunk, three fox and one cat. Bats were the species most often submitted for testing (1,387), followed by cats (958) and dogs (823). Typically, 4-6% of the bats tested by MDCH BOL are positive for rabies. In 2009, 3.8% of bats tested were positive. One of the 53 positive bats was tested by the Indiana Department of Health but was collected in Cass County, MI and exposed a Michigan resident. (Click on map to access rabies surveillance maps on the MDCH Rabies website)

While rabies positive terrestrial animals in Michigan are typically infected with the north central skunk-strain and confined geographically to the “thumb” area of the state (southeast lower peninsula, see map next page), in 2009 there were three notable exceptions to this rule:



- In June, a sick-acting fox was picked up by the local animal control agency in Clinton County. Because the animal had not exposed any people or pets, the animal was turned over to the USDA/WS office in Lansing as a rabies surveillance specimen. The fox tested positive for rabies using a field test called the direct rapid immunohistochemical test (DRIT), and was confirmed by CDC to be infected with the north central skunk-strain. This is the first rabid fox identified in Clinton County since 1986, when a fox was found to be infected with a bat variant of the virus.



- In July, a strange-acting fox that attacked a small child in Oceana County was found to be rabid and infected with a bat-strain of rabies. The last time a terrestrial species in Michigan was identified with a bat strain of rabies was in 2000/2001 when three fox on Mackinac Island were found to be infected.

- In December, several sick and dead fox and skunk were observed over a one week period in Ingham County. One skunk and one fox were collected by the DNR. Rabies testing was performed by a USDA/WS biologist using the DRIT test. The fox was negative for rabies and positive for distemper. The skunk was positive on the DRIT test, and was later confirmed by CDC to be infected with the north central skunk-strain of rabies. This is the first rabies-positive skunk identified in Ingham County in 40 years.

All Terrestrial Animal Rabies Cases in Michigan: 2003 - Present

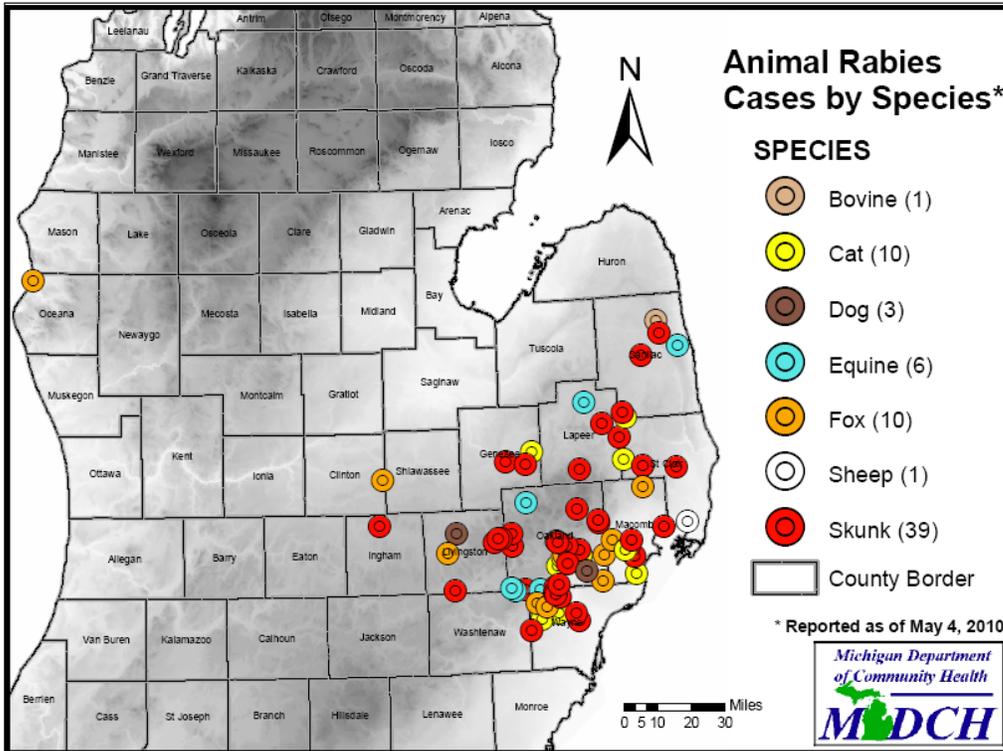
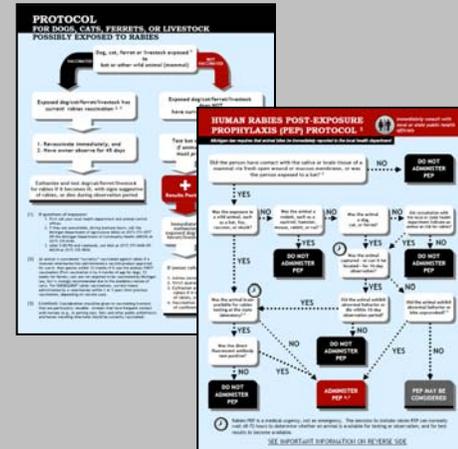


Figure 4: Geographically, bat rabies is generally wide-spread across the Lower Peninsula of Michigan, although cases do occur in the Upper Peninsula. As can be seen in the map above, terrestrial rabies in wild and domestic animals is mainly restricted to the southeastern region of the state. Click on the map above for a larger version at the MDCH Rabies website.

Don't Forget!!



New rabies flowcharts are available from MDCH and can be downloaded from: www.michigan.gov/rabies
 OR
 Call 517-335-8165 to order full-color, cardstock copies.

New ACIP Guidelines for Rabies Post Exposure Prophylaxis

The Advisory Committee on Immunization Practices has published new guidelines for human rabies post exposure prophylaxis. These guidelines were published in the [Morbidity and Mortality Weekly Report: March 19, 2010 / Vol. 59 / No. RR-2](#). This report summarizes new recommendations based on extensive reviews of literature and clinical study, highlights are as follows:

- For immune competent individuals receiving first-time rabies post exposure, the recommended series has been reduced from a series of:

5 vaccine doses administered on days 0, 3, 7, 14, and 28

TO

4 vaccine doses administered on days 0, 3, 7, and 14

- ACIP recommendations for the use of Rabies Immune Globulin (RIG) remain unchanged.

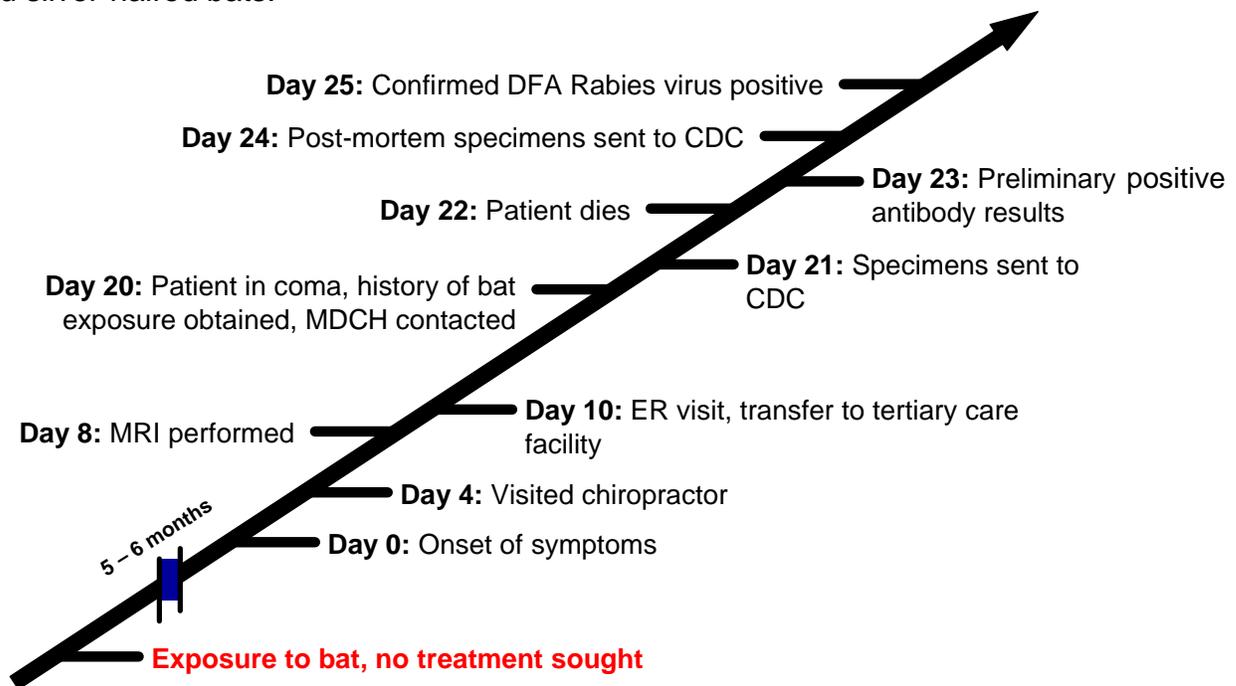
- The number of doses recommended for persons who are immunosuppressed has not changed.



Michigan Human Rabies Case, 2009

In 2009, Michigan reported its first human rabies death since 1983 in a 55 yo male from Missaukee County. The patient was hospitalized in late October following a 10 day illness that included numbness and pain in his left upper extremity and pain in his upper back and neck. The patient sought care at a local emergency room when he began experiencing weakness in his left arm, ataxia and dysphonia. During the exam, the patient's breathing became increasingly stridorous and he was observed to have difficulty swallowing. The patient was intubated and transferred to a tertiary care clinic. There, the patient experienced a progressive flaccid paralysis.

A family member recalled an incident involving potential exposure to a bat, and the treating physician contacted MDCH and CDC regarding rabies testing. Serum, spinal fluid, saliva and a nuchal biopsy were collected and submitted to CDC. The patient's condition deteriorated and he was removed from life support. Antibodies to rabies virus were detected in the patient's serum and spinal fluid and rabies virus genetic material was detected in the spinal fluid. Following receipt of the preliminary positive results, the family gave permission for a brain autopsy and tissues were submitted to CDC. A direct fluorescent antibody test (DFA) test performed on the brain tissue was positive for rabies virus, and monoclonal antibody testing determined that the infection was due to a strain of rabies associated with eastern pipistrelle and silver-haired bats.



Approximately 5-6 months prior to his illness onset, the patient awoke with a bat on his arm. He disposed of the bat and did not tell his wife about the incident. He did not realize that the exposure presented a risk for rabies and did not seek treatment at that time. Approximately 180 medical staff and 14 family members and friends were evaluated for exposure to the patient's saliva and neural tissue. Six medical staff and 12 family members received post-exposure treatment.



Request to Update Rabies Contact Persons

Ideally, we request each county designate a person(s)

COUNTY: _____

PRIMARY CONTACT (please print legibly)

Name:	
Address:	
City:	Zip:
Telephone: ()	
Fax: ()	

SECONDARY CONTACT (please print legibly)

Name:	
Address:	
City:	Zip:
Telephone: ()	
Fax: ()	

For multi-county jurisdictions, please coordinate the response from your jurisdiction.

Questions may be directed to MDCH at 517-335-8165

PLEASE RETURN VIA FAX TO: 517-335-8263 by May 31, 2010

Thank you!

2009 Michigan Arbovirus Surveillance Report

West Nile virus (WNV) has become endemic in Michigan following the first identification of the virus in the state in 2001. This document contains detailed information about the 2009 human, bird, and mosquito data collected using various active, early warning systems, and passive surveillance for human cases.

Arbovirus Surveillance – 2009 Summary

West Nile Virus

Human:

1 Confirmed case; Wayne County, 56 yo male, encephalitis, AFP, onset 9/14/09

1 Viremic Blood Donor; Kent County, 44 yo male, no illness, no travel, donation date 8/13/09

Mosquitoes:

- 2 Positive pools, Bay County
- 1 Positive pool, Saginaw County
- 1 Positive pool, Wayne County

Avian:

- No positive corvids reported
- 1 Confirmed red-tailed hawk from Lenawee County

Equine:

- 1 Probable case; Schoolcraft County

Wildlife:

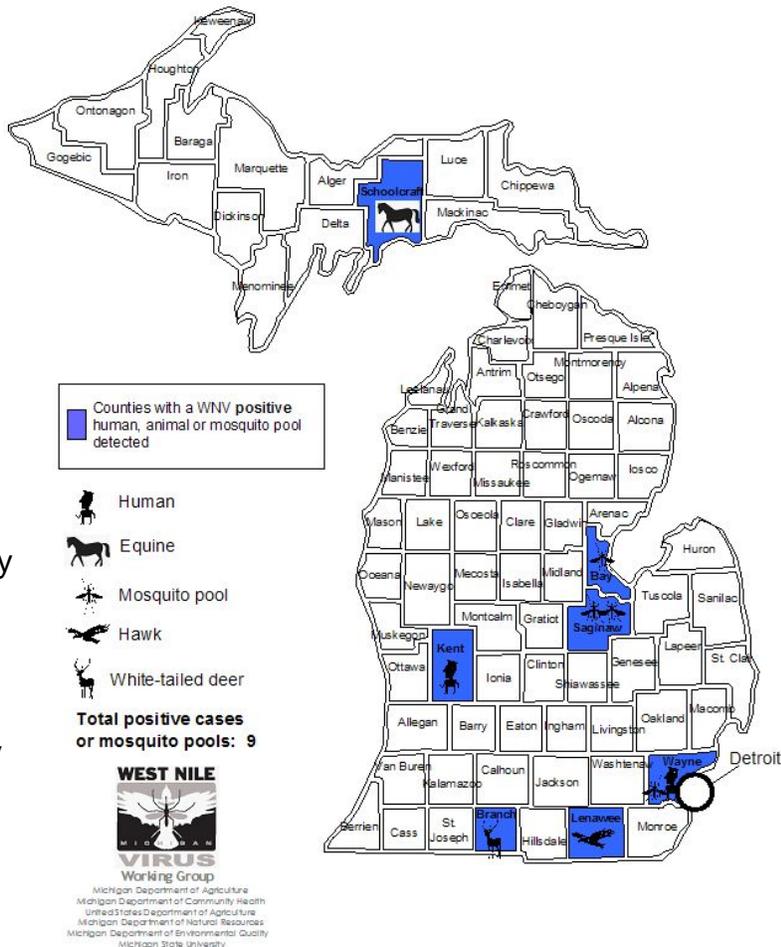
- 1 Confirmed white-tailed deer from Branch County

Eastern Equine Encephalitis

Domestic and Wildlife:

- 1 Confirmed emu farm, Oakland County
- 1 Confirmed emu, Schoolcraft County
- 1 Confirmed white-tailed deer from Branch County

2009 West Nile All Species Testing Results Final 2009



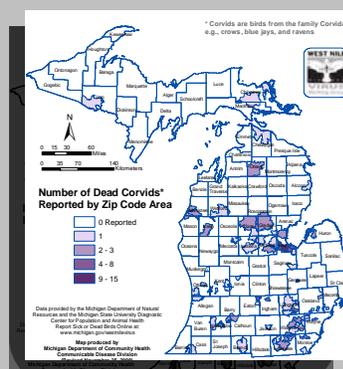
REPORTING SICK/DEAD WILDLIFE*

Wildlife species can be an important and early indicator of West Nile virus activity in an area.

Citizens should be directed to the State's [West Nile Virus](http://www.michigan.gov/westnilevirus) page to report sick/dead wildlife:

www.michigan.gov/westnilevirus

Reports are compiled on a weekly basis and maps and tables are posted to the website for the most up-to-date picture of potential West Nile risk.



*Let MDCH know if your county West Nile Virus contact information needs to be updated; (517) 335-8165 or signskv@michigan.gov.

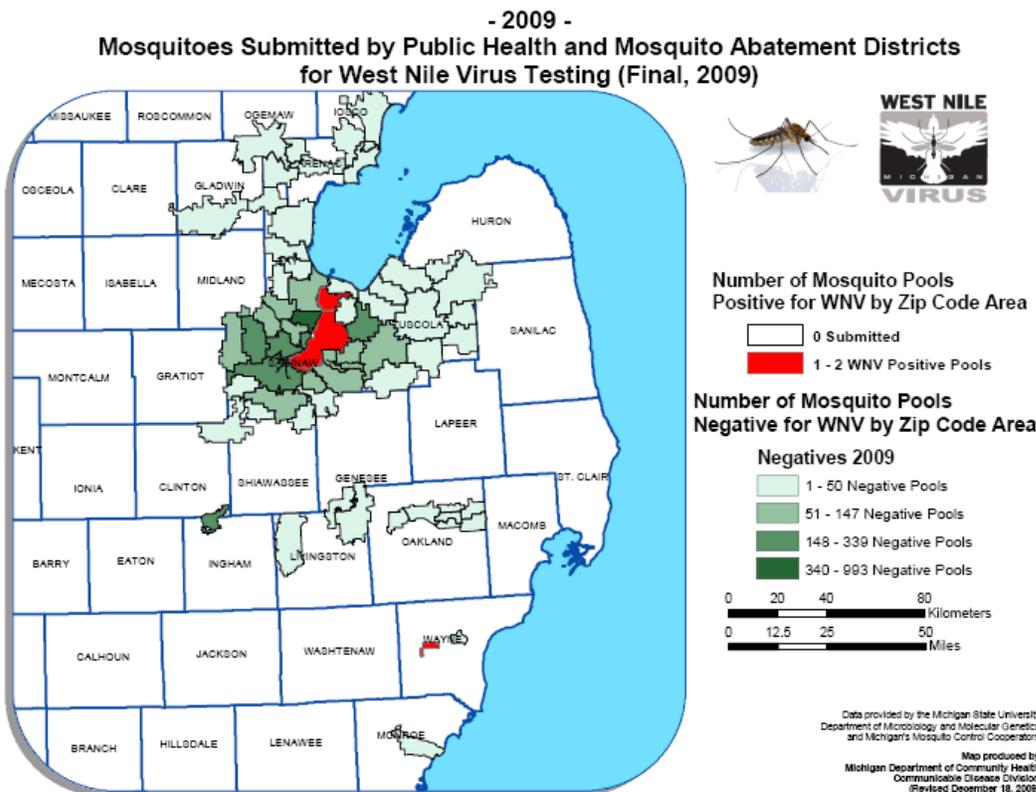
Mosquito surveillance

Effective Integrated Pest Management (IPM) vector-control programs can reduce human illness during outbreak years, and provide the necessary surveillance tools for preemptive detection. MDCH has always supported and encouraged community level vector-control activities. Michigan's mosquito abatement districts are decentralized and depend largely on community level awareness and education to provide funding for activities. The West Nile virus outbreaks of 2001-2002 raised this level of awareness, and spurred communities to conduct surveillance and control activities with the assistance of MDCH and its partners.

In 2009, over 8800 mosquito pools were tested by mosquito control districts in the "thumb" area of the state, as well as several smaller municipalities in SE Michigan (Table 1 and map below). High *Culex* mosquito populations, and identification of positive mosquito pools has been shown to precede peak human WNV illness by several weeks.

Table 1 – Mosquito testing in Michigan, 2009

Arbovirus Tested	Pools Tested	Mosquitoes Tested	Positive Pools
TOTALS	8807	135090	5
West Nile Virus (WNV)	4572	68792	4
St. Louis Encephalitis (SLE)	2046	11274	0
La Crosse (LAC)	457	729	1
Eastern Equine Encephalitis (EEE)	1732	54295	0



MMCA Members include Michigan's public and private mosquito control personnel. The volume of testing and surveillance for mosquito-borne diseases to protect public health could not be accomplished without them.

For More Information and Publications visit them on the web at:

<http://www.mimosq.org>

When dealing with West Nile virus, prevention is your best bet. Fighting mosquito bites reduces your risk of getting this disease, along with others that mosquitoes can carry. Take the commonsense steps below to reduce your risk:

Avoid Mosquito Bites

✓ Use Insect Repellent

on exposed skin when you go outdoors. Use an EPA-registered insect repellent such as those with DEET, picaridin or oil of lemon eucalyptus. Even a short time being outdoors can be long enough to get a mosquito bite. For details on when and how to apply repellent, see [Insect Repellent Use and Safety](#) in our [Questions and Answers](#) pages. See also [Using Insect Repellent Safely](#) from the EPA.



✓ Clothing Can Help Reduce Mosquito Bites

When weather permits, wear long-sleeves, long pants and socks when outdoors. Mosquitoes may bite through thin clothing, so spraying clothes with repellent containing permethrin or another EPA-registered repellent will give extra protection. Don't apply repellents containing permethrin directly to skin. Do not spray repellent on the skin under your clothing.

Get double protection: wear long sleeves during peak mosquito biting hours, and spray repellent directly onto your clothes.

✓ Be Aware of Peak Mosquito Hours

The hours from dusk to dawn are peak biting times for many species of mosquitoes. Take *extra* care to use repellent and protective clothing during evening and early morning -- or consider avoiding outdoor activities during these times.

Mosquito Proof Your Home



✓ Drain Standing Water

Mosquitoes lay their eggs in standing water. Limit the number of places around your home for mosquitoes to breed by getting rid of items that hold water. Need examples? Learn more on the [Prevention of West Nile Virus](#) Question and Answer page.

✓ Install or Repair Screens

Some mosquitoes like to come indoors. Keep them outside by having well-fitting screens on both windows and doors. Offer to help neighbors whose screens might be in bad shape.

Help Your Community

✓ Report Dead Birds

Dead birds may be a sign that West Nile virus is circulating between birds and the mosquitoes in an area. Over 130 species of birds are known to have been infected with West Nile virus, though not all infected birds will die. It's important to remember that birds die from many other causes besides West Nile virus. By reporting dead birds to state and local health departments, you can play an important role in monitoring West Nile virus. You can access the [SICK OR DEAD BIRD AND MAMMAL OBSERVATION REPORT](#)

✓ Mosquito Control Programs

Check with local health authorities to see if there is an organized mosquito control program in your area. If no program exists, work with your local government officials to establish a program. The [American Mosquito Control Association](#) can provide advice, and their book *Organization for Mosquito Control* is a useful reference.

2009 Michigan Lyme Disease Surveillance Report

Lyme disease is transmitted by ticks and is the most commonly reported disease associated with tick bites in the United States with more than 20,000 cases reported annually. Illness is caused by a bacteria (*Borrelia burgdorferi*) that infects a variety of small mammals in the Upper Midwest and Northeastern United States, and is then transmitted to people through the bite of an infected Blacklegged tick (*Ixodes scapularis*). In Michigan, Lyme disease in ticks and people has historically been isolated to the Western Upper Peninsula, but is now appearing in the western counties of Lower Michigan.

In the early stages, most infected people will experience a “flu-like” illness that includes fever and body aches. Up to 70% of infected persons will also present with a “Bull's-eye” rash, erythema migrans, around the site of the tick bite 3-30 days after exposure. The rash expands over time, with no pain or itching, and will resolve without treatment.

Early symptoms may include:

- Headache
- Spreading Rash
- Nausea
- Aching Joints and Muscles
- Fever
- Fatigue

If not treated, some people may develop complications involving the heart and/or nervous system. Specific disorders may include: various degrees of heart block, nervous system abnormalities such as meningitis, encephalitis and facial paralysis (Bell's palsy), and other conditions involving peripheral nerves, painful joints, tendons, or muscles may also be noted during this stage of the disease.



Erythema Migrans with central clearing

© 2001-05, Dermatlaas



Multiple rashes

© 2001-05, Dermatlaas



Vector Tick Geographic Distribution

Increased attention is currently being focused on Western Lower Michigan. This area, which previously showed no evidence of Lyme disease activity, has been identified as an area of concern by researchers studying the Blacklegged Tick. Investigations conducted from 2001-2010 have discovered that tick populations are being established in these areas, and Lyme bacteria has been found in the wildlife and tick populations. The highest populations of the vector tick in the state, however, remain in the western Upper Peninsula. Figure 12 to the right summarizes these results.

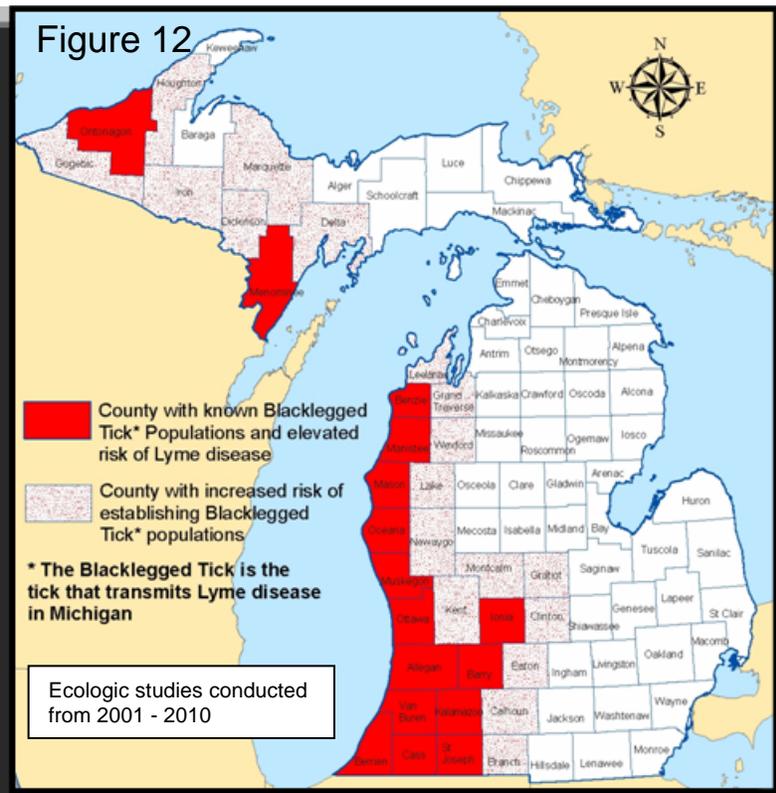


Figure 15 Total Reported Lyme disease cases by year, Michigan 2000-2009

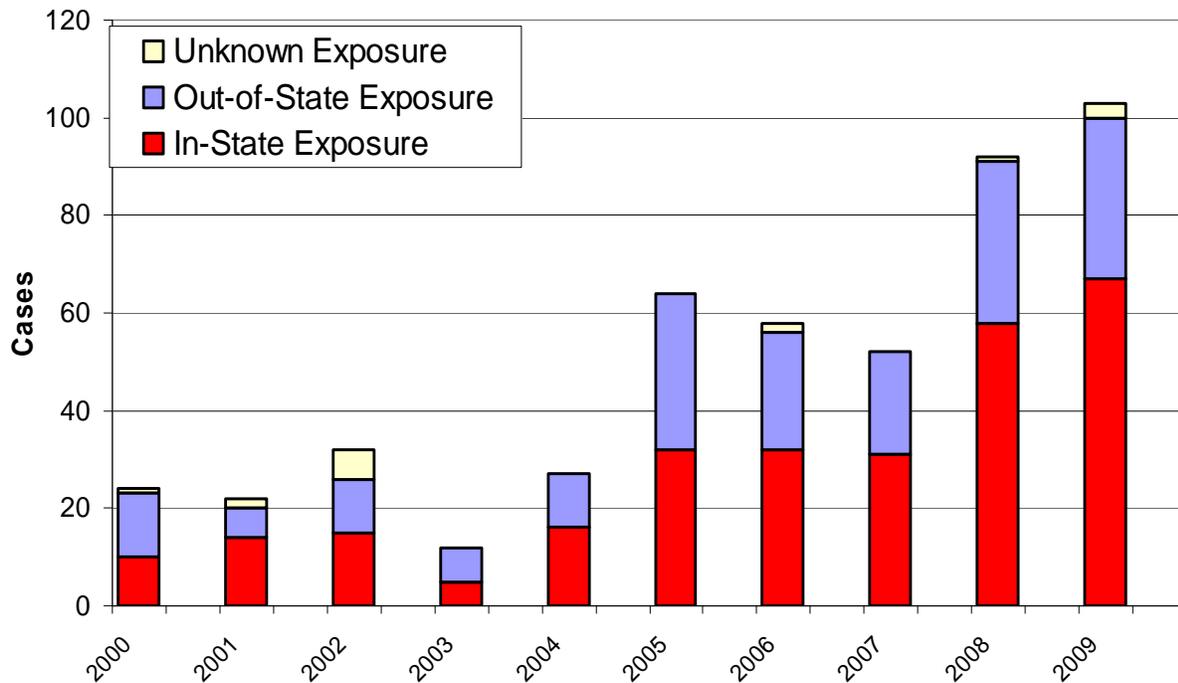


Figure 15: Lyme disease cases, both In-State and Out-of-State exposures, have increased between 2000 and 2009. This may be due to increased awareness and diagnosis locally and nationally, and to the expansion of the vector tick into more habitats in Michigan.

Figure 16 Michigan Lyme Disease In-State Exposures by Region: 2000-2009

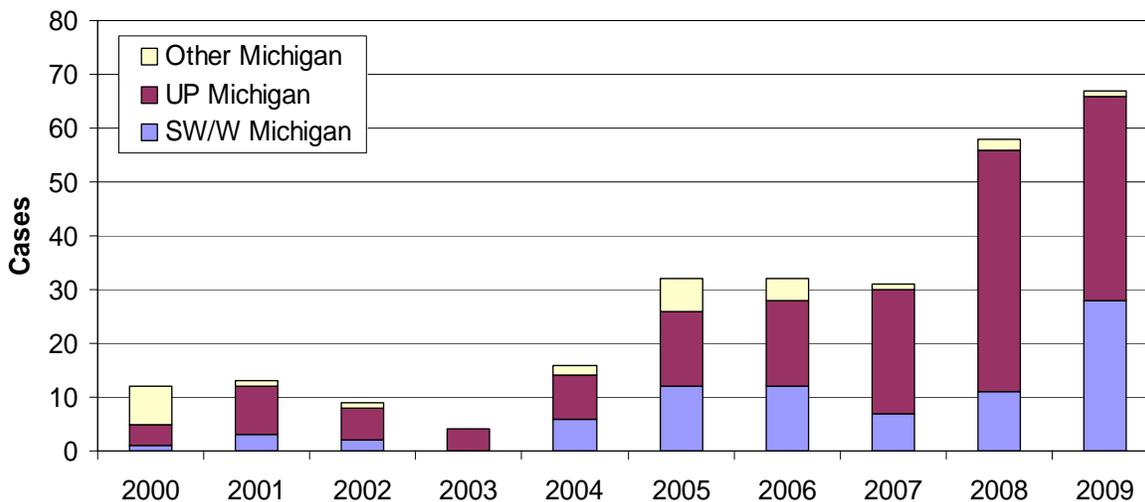
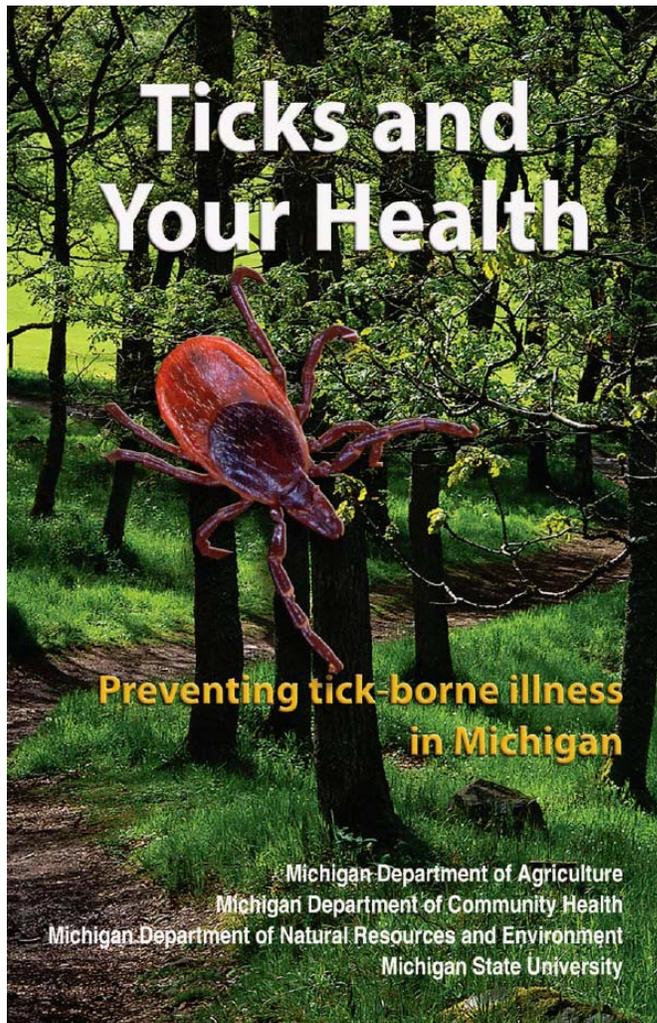


Figure 16: Of the locally acquired Lyme disease cases in Michigan from 2000-2009, there is an increasing trend of reported cases from the Upper Peninsula and SW Michigan, with the remainder of Michigan where tick populations are absent or unknown remaining stable. Out-of-State exposures are also increasing, with many Michigan residents visiting endemic areas in the NE United States and areas of the upper Midwest.

New Resource



A new tick-borne disease pamphlet is now available in the Lyme disease section of the Emerging Diseases website (click the image at left for full publication). This updated guide provides the newest information on Lyme disease in Michigan as well as a host of other tick-borne illnesses. The primary focus of this new publication is the expanded prevention section which highlights:

- Knowledge of tick infested areas
- Personal protective measures
- Prevention in pets
- Landscaping suggestions for those living in regions where “deer ticks” are emerging!

This new section is particularly important for residents, tourists, and those spending time in recreational camps on Michigan’s western shoreline. During the summer of 2009, a joint MDCH/Allegan Co. investigation identified a focus of Lyme disease transmission at a recreational camp in Michigan’s shoreline dunes habitat. Education/awareness, insect repellent, frequent tick checks, and landscape use/modification can dramatically reduce the risk of acquiring Lyme disease in these areas. See the recommendations on the following page and Spread the word!!

Protect Yourself Against Lyme Disease in Spring, Summer, and Fall



If you are going to be in areas that may be tick infested, there are several ways you can protect yourself:

- An infected tick must feed for approximately 48 hours to transmit Lyme disease bacteria to its host. Therefore, prompt removal of ticks can prevent infection.
- Apply insect repellents that contain DEET to clothes and exposed skin, and/or apply Permethrin (which kills ticks on contact) to clothes to reduce the risk of tick attachment. Apply according to label guidelines.
- Several Michigan agencies can identify or test ticks from people or animals, for more information contact your local health department or visit Michigan’s Lyme disease website at:

www.michigan.gov/lymedisease

Preventing Lyme Disease in Recreational Camp Settings

The Blacklegged tick (formerly Deer tick) is now established in Michigan's western shoreline communities. These ticks are potential vectors of Lyme disease and other illnesses. The ticks are active during the summer months when tourism and camp activities in the area are highest. There are several ways to prevent ticks from becoming a problem for your campers and staff, and to prevent Lyme disease illness.

Be Aware

Knowing that ticks are present in the environment and how to avoid them is an important first step:

- Post informational placards/posters and trail-head signs alerting staff and campers.
- Train staff to identify ticks, and the proper way to remove them.
- When campers and staff arrive, incorporate tick awareness into safety and health briefs.

Go to www.michigan.gov/lymedisease for up-to-date information on tick distribution

Staff and Camper Personal Protection

Being aware that ticks may be in your environment is a great first step, but if you do happen to encounter them, it will not keep them from biting. Here are some recommendations to keep ticks off your skin:

- Require campers to have an [EPA approved insect repellent](#). DEET (20%-30%) is the repellent recommended by the Centers for Disease Control and Prevention (CDC) to repel ticks.
- Do Not simply suggest or recommend that campers wear repellent when recreating in wooded environments (and this means even walking trails to the beach) – watch them apply the repellent to their skin.
- Wearing long pants with pant legs tucked into socks will help keep ticks from attaching to the skin. Pants can also be treated with approved repellents such as permethrin (which also kills ticks). While effective, this can be hard to follow when temperatures are high.



- Perform frequent tick checks – staff can assist campers with hard to see areas such as the scalp, ears, shoulders, and back of legs. Campers should be instructed to check the beltline, buttocks and groin area while showering.
- Have tick removal kits available for staff. If the camp has a nurse or EMT on staff, have them perform the tick removals, assess and care for the bite site.
- If a camper presents with acute illness (fever, rash, body/muscle ache), have a physician evaluate for tick-borne disease. Always report suspected cases of tick-borne disease to the local health department, even in the case of out-of-state visitors and campers.

Landscape and Facility Protections

Knowing where ticks congregate in the landscape is important to effective tick avoidance and control. There are methods to effectively combat ticks through the use of landscape modification and insecticide treatments. Below are important recommendations to consider:

- Ticks prefer moist, shaded wooded environments and well drained soils. They will normally congregate on vegetation from ground level to one meter high, along the edges of human and wildlife trails.
- Trimming vegetation and leaf litter back from the edge of trails used by campers and staff can help to prevent tick encounters.
- Maintain “high impact” zones where campers recreate most often (fields, playgrounds, etc.). Open, sunlit spaces with well trimmed grasses are least suitable for ticks. Vegetation at the edges of these areas should be kept trimmed. Lining the edges with mulch or rock borders will help prevent tick migration into these areas.

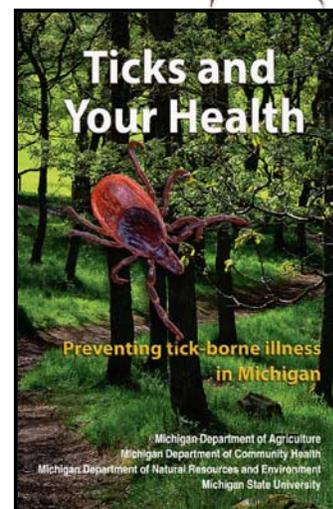


- Trim vegetation back from cabins and sleeping quarters. This will keep questing ticks and their rodent hosts farther from sleeping areas. Seal any cracks or holes that might allow rodent access.
- Insecticides labeled for use against ticks can be used along the edges of trails or recreation areas. Early season application of insecticide can have a large impact on tick populations throughout the summer. Application should be by a trained and certified pesticide applicator.

Read the “Ticks and Your Health” brochure, available at

www.michigan.gov/lymedisease

or see www.cdc.gov for more information



Michigan's Five Most Common Ticks

Ticks are significant vectors (carriers) of pathogens that cause human and animal disease. In Michigan, tick-borne diseases are rare, but they do occur and can be serious if not properly diagnosed and treated.



American Dog tick *Dermacentor variabilis*

The American Dog tick is by far the most common tick found in Michigan. It is active from early May-November. It will readily bite humans and our companion animals. This species is the vector of Rocky Mountain spotted fever and tularemia, and is easily distinguished by its ornate scutum.



Lone Star tick *Amblyomma americanum*

Known by its distinctive "Lone Star" marking, this tick is becoming more prevalent in Michigan. It will readily bite people and our companion animals, and is the vector of monocytic ehrlichiosis and tularemia. This tick is common in wooded areas with populations of white-tailed deer.



Black-legged tick *Ixodes scapularis*

Emerging as a serious public health concern in Michigan, the Black-legged tick is the vector of Lyme disease, granulocytic anaplasmosis, and babesiosis. This tick readily quests for hosts in the low vegetation of forests with abundant small mammals and white-tailed deer; accumulating along human and game trails.

Woodchuck tick *Ixodes cookei*

Often confused with the Black-legged tick, *Ixodes cookei* is common in Michigan and will readily bite dogs and humans. People and pets will often come in contact near the dens of animals (skunks, woodchucks) in wooded environments. This species is the vector of Powassan encephalitis.



Brown Dog tick *Rhipicephalus sanaguineus*

Also known as the Kennel tick, this species is unique in its ability to survive and breed in indoor environments. It is the vector of Rocky Mountain spotted fever, canine babesiosis and canine ehrlichiosis. Hygienic practices in shelters/kennels can prevent infestations.



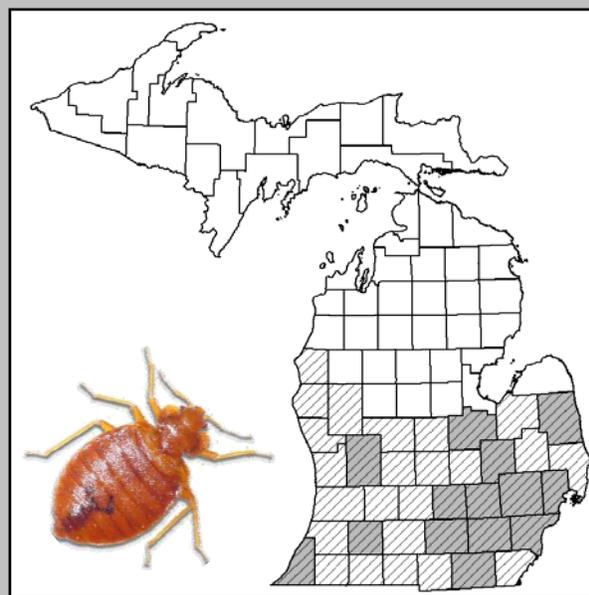
All photos © Kent Loeffler, Cornell University Extension

Bed Bugs are Back!!

Michigan's "Bed Bug Working Group" update

State and local public health authorities have seen increasing calls and public concern over a once forgotten pest, bed bugs! Recently bed bugs have made a resurgence in the U.S., infesting hotels, apartment complexes, and homes nationally. Although not known to transmit any human disease, they leave a trail of potentially itchy or painful bite reactions, stress, anxiety and costly extermination bills in their wake. Reports from local public health and pest management industry indicate that much of Lower Michigan is experiencing infestations.

The Michigan Department of Community Health recently established a Bed Bug Working Group including multiple state and local government agencies, public universities and stakeholder groups. The group has gained national attention for its focus on education/outreach and the coordination of public and private sector. The group has held multiple training events, developed educational materials and recommendations, and is in the process of finalizing a comprehensive prevention and control manual.



Hatched counties indicate reports of bed bug infestations from the pest management industry; Gray shaded counties indicate increasing reports to local public health

Bed Bug Resources

Resources are posted to the State of Michigan Bed Bug website as they become available.
www.michigan.gov/bedbugs

Full Prevention and Control Manual to be posted soon!

Bed Bugs: What Schools Should Know

Recently, Michigan and other states have seen infestations plaguing residents. As bed bugs may find their way into schools. When this proactive action to prevent infestation and setting.

What are bed bugs?

Bed bugs are small, brownish, flattened insects that feed on the blood of people while they sleep. Although the bite does not hurt at the time, if it develops into an itchy welt similar to a mosquito bite. Bed bugs do not transmit disease, but they can cause significant itchiness, anxiety, and sleeplessness. Bed bug infestations are also very difficult and expensive to control.

Usually, bed bugs will hide during the day and come out to feed during the night. Unlike head lice they do not live on a person. However, they can hitchhike from one place to another in backpack clothing, luggage, books, and other items.

Could my classroom be infested?

Actual bed bug infestations in schools are uncommon but hitchhike to school from an infested home by Bed bugs that hitch a ride into the school in one by another student, making the school a potential minor concern – bed bugs are very expensive to control.

If a school plans to use pesticides to control pests Michigan law to have an integrated pest management infestation is suspected or a number of students should contact a licensed pest management professional.

This fact sheet has been published by the Michigan Bed Bug Working Group (July 2009).

Bed Bug Management: Making Decisions, Management of Suspect

Bugs observed, bites experienced during the day or night. DON'T PANIC!

YES

Inspect the sleeping area for signs of bed bugs. Pay close attention to mattress, bed frame, headboard, and bedside tables.

YES

Live (crawling) bugs, cast skins, eggs, or dried blood spots present?

NO

- DO NOT travel
- Consider other cause of bites
- Monitor restlessness
- Educate tenants regarding bed bug prevention

YES

Do bugs resemble bed bugs? (compare to www.michigan.gov/bedbugs) or has professional identified as bed bugs?

NO

- DO NOT treat
- If still unsure, consult professional
- If another type of insecticide is identified, accordingly
- Educate tenants and spreading

YES

Landlord or Property Manager

- Contact landlord
- Cooperate with landlord & pest management professional to implement integrated pest management plan
- Reduce clutter, vacuum, steam, and wash bedding
- DO NOT attempt to treat with insecticides. Regulations may require that insecticide application be performed by a licensed applicator only.

Tenant

- Contact licensed pest management professional to implement integrated pest management plan (ask about bed bug experience)
- Reduce clutter, inspect & vacuum crevices around room and furniture, couch, cribs
- Encase mattress to restrict access by bed bugs

For more information about bed bugs, prevention, and management visit: www.michigan.gov/bedbugs

This fact sheet has been published by the Michigan Bed Bug Working Group (July 2009) and adapted from the University of Michigan School of Public Health © 2009

Bed Bugs & Mattresses: A Fact Sheet for Michigan Consumers

What are Bed Bugs?

Bed Bugs are small insects that feed on the blood of humans and animals. They are brought into households through items, established in a home to get rid of. Some but other people who are not known to be a "nuisance" or "pest" concern. See www.michigan.gov/bedbugs

How do I know if I have Bed Bugs?

If you have bites that you can't identify, they can often be found in the folds, along the headboard and furniture naps" and cast skins can be a sign that they are around.

How can I get rid of Bed Bugs in my mattress?

If you find or suspect you have Bed Bugs in your home or on your mattress recommended that you call a pest management professional. Bed Bug difficult to treat in the later stages. Things you can do yourself to control:

- Vacuum the area around the bed thoroughly, and vacuum the mattress area around the bed and remove excess clutter. Make sure to discard into a sealed bag or container (preferably outside) so Bed Bugs will not spread.
- Laundry all bedding in hot water, and dry on high heat.
- DO NOT spray pesticides on the mattress where they may come in contact with the mattress and help prevent new bugs from living on the mattress.
- If you find evidence of Bed Bugs on your mattress, encase the mattress in a high quality, zippered mattress cover. These are labeled "hypoallergenic" or "dust mite proof" – this will prevent Bed Bugs from living on the mattress and help prevent new bugs from living on the mattress. The zipper is often the "weak point" of the cover, and taping this may help.
- Steam will kill Bed Bugs – a commercial steam cleaner can be used on the mattress and box spring and on carpeting and along the baseboards of a room where Bed Bugs may hide.
- Discarding the mattress isn't always effective – If Bed Bugs are not controlled and eradicated, a new mattress can become infested very quickly.

How to Move and Leave Bed Bugs Behind

If you think that moving will automatically eliminate your bed bug problem, think again!

Unless you take the right precautions, your bed bugs are likely to move with you causing more trouble in your new living space. However, if you must move to a new home before your bed bug infestation has been eliminated, you can take measures to avoid bringing bed bugs with you:

Packing:

- Place all belongings in clear plastic bags and seal tightly. Sort items by type (clothes, towels, sheets and blankets) and keep things that are known to be infested away from clean items.
- Wash and dry all fabric items on the hottest recommended setting and then seal them in clear plastic bags labeled "Clean".
- Put items that cannot be sanitized into sealed clear plastic bags (electronics, appliances, books, etc.) and ask a professional pest manager how these items should be treated.
- Purchase bed bug proof mattress covers for the beds of each member of the household. Also cover box springs.
- If you decide to throw away infested furniture or mattresses, wrap them in plastic and clearly label "Bed Bugs" on them, so neighbors won't bring the items into their homes. You may want to go even further and physically slash or destroy the items as well.

Moving Day:

- Have each person shower and change into clean clothes and shoes and bag up the current (possibly infested) clothes for laundering.
- Give pets a bath to ensure that they are bed bug free before taking them to your new home.
- All furniture should be sanitized. Furniture such as mattresses and bookshelves can be most effectively sanitized and treated when they are empty. If you are moving furniture items that may be infested, you should first remove and pack the contents of the furniture. The furniture should then be treated by a licensed pest management professional before moving into your new residence.

Unpacking:

- Before personal belongings can be accessed in the new home, they MUST be bed bug free, or the new home likely become infested as well.
- Laundry any items not labeled "Clean" before using.
- If you acquire any new or used furniture, inspect it carefully before bringing it into your home to make sure it is bed bug free.
- Educate yourself about bed bugs and what to look for fact sheets from <http://www.michigan.gov/bedbugs>
- Contact your building manager immediately if you notice any signs of bed bugs in your new home. The earlier infestation is detected, the easier it will be to treat.

Produced by the Michigan Bed Bug Working Group

MAHO Michigan Association of Housing Officials

PROPERTY MANAGEMENT ASSOCIATION OF MICHIGAN

MICHIGAN PEST MANAGEMENT ASSOCIATION

MICHIGAN STATE UNIVERSITY EXTENSION

This fact sheet has been published by the Michigan Bed Bug Working Group (July 2009) and adapted from materials provided by J.L. Gangloff-Kaufmann and C. Piffner, New York State PMP Program, Cornell University.

Don't let **Bed Bugs** Bite



Guidelines to help you solve bed bug problems

WARNING!
 Bed bugs are back with a vengeance!
 Any house, apartment or building can be a haven for bed bugs.

Produced by the Michigan Bed Bug Working Group

MAHO Michigan Association of Housing Officials

PROPERTY MANAGEMENT ASSOCIATION OF MICHIGAN

MICHIGAN PEST MANAGEMENT ASSOCIATION

MICHIGAN STATE UNIVERSITY EXTENSION

Bed Bugs are Back: Implications for Public Health

Erik Foster
Medical Entomologist
COMMUNICABLE DISEASE DIVISION

The human bed bug (*Cimex lectularius* – Figure 1) is the most rapidly emerging public health pest in North America. The bed bug is a nocturnal, bloodsucking ectoparasite supremely adapted to human living environments. Infestations may lead to measurable physical and mental health effects. It is thought that increasing tourism, interconnectedness of global economic markets, pesticide resistance, and a modern lack of institutional knowledge about the pest have led to a dramatic resurgence over the last decade. Public health authorities from New York to San Francisco have seen reports of infestations increase up to ten-fold, and the pest management industry has seen significant increases in business related to bed bugs.

This “Bogey in the Night” was once very common with some pre-WWII estimates placing the infestation rate of homes in the U.S. at 10-30%. The wide use of the organochlorine insecticide DDT during this era (which was used to control typhus and malaria in troops and civilians) and increases in sanitation and public health are thought to have led to a dramatic decline in bed bug populations.

Human bed bugs are almost always associated with human dwellings as they require proximity to sleeping hosts for their food supply. Thus, in Michigan and elsewhere, they are found primarily in homes, apartments, hotels, shelters, and dormitories. It is important to note that the presence of bed bugs in human dwellings is not necessarily associated with deficiencies in cleanliness and personal hygiene. They are an equal opportunity pest that only requires a warm, sleeping body and a place to hide nearby.

Bed bugs are difficult to control because they are so skilled at hiding, which allows them to travel in our belongings (clothing items, luggage, furniture, electronics, etc.) without our knowledge. Most people do not even realize they have visited somewhere with an infestation, and bring the bed bugs back to their residence unwittingly. Once established in a residence or unit in a building, the bed bugs can travel between rooms or apartments through walls and conduits, or easily on people’s clothing or other belongings.

Bed bugs normally feed late at night or early in the morning when the host is in deepest sleep. Most people are unaware when being fed upon – the bed bug is stealthy and even the penetration of its mouthparts into the skin can barely be felt because its saliva contains desensitizing agents. The bite sites are usually small, pinprick-sized lesions that may or may not cause local inflammation. Reactions to bed bug bites vary from person to person. Most people show no reaction the first time they are bitten, but subsequent bites may develop into welts that itch, some more than others. Some people react severely with welts that itch for weeks.

While blood-borne pathogens have been detected in recently fed bed bugs, there is little evidence in the literature that they transmit communicable diseases between people. The physical effects of bed bug bites vary widely, ranging from little reaction to permanent scarring and allergic sensitization. Other health and economic effects may include:

- Anemia from prolonged exposure to large infestation
- Potentially exacerbated asthma symptoms from cast skins
- Psychological impacts including repulsive reaction, stress, anxiety, social isolation, and loss of sleep and productivity



Figure 1: Lateral view of an adult human bed bug (*Cimex lectularius*) feeding on a “volunteer.” Photo: Piotr Naskrecki, courtesy of CDC Public Health Image Library.

- Financial stress due to the high cost of pest management, replacement of furniture and personal items, physicians visits, and time away from work
- Some people are driven to take extreme actions to rid themselves and their homes of these pests, potentially harming themselves and their families with pesticides or other hazardous methods (see sidebar, page 7).

The recent resurgence of bed bug infestations in North America has public health authorities, regulatory agencies, the lodging industry, pest managers, property managers and the public scrambling for information and solutions. In Michigan, evidence from these sources point to significant levels of infestation in our urban environments, particularly in multi-unit housing situations. In these regions, infestations have increased to epidemic levels (Figure 2). Rapidly increasing reports and complaints also highlight the need for attention to vulnerable populations, such as senior living facilities, adult foster care, and homeless shelters.

Public complaints have been varied, and speak to the complexities of dealing with bed bug infestations. Because of the challenging scope of this issue, a multi-faceted approach must be taken to infestation management and community outreach:

Knowledge Base/Educational Needs

- Institutional Knowledge: Training is needed for “frontline” staff of impacted agencies. These staff are often the first to receive complaints and if provided training can help to direct those affected to appropriate assistance. This effort is ongoing by the Michigan Department of Community Health (MDCH) and partner agencies.
- Resources: Addressing educational needs in the areas of protocols & recommendations for management, worker protection issues, and pesticide safety issues. MDCH has established a web-portal at www.michigan.gov/bedbugs to provide “Michigan-centric” information to the public, and a comprehensive manual will be published to the site soon.

Economic Issues

- Cost of Treatment: The high cost of bed bug treatment and repeated visits is prohibitive to low-income or fixed-income individuals as well as property managers and landlords. Arguments between parties about economic responsibility for treatment cause delays, further intensifying and spreading infestations.

• Continued Page 7

