Michigan Zoonotic & Vector-Borne Disease
Surveillance Summary

May 2012 Reports

I. Overview
II. Lyme Disease
III. Rabies
IV. Arboviruses
V. Other Projects

PREPARED BY THE MICHIGAN DEPARTMENT OF COMMUNITY HEALTH
DIVISION OF COMMUNICABLE DISEASE
ZOONOTIC DISEASE AND SPECIAL PROJECTS SECTION

201 Townsend St., 5th Floor | Lansing, MI 48913
(517) 335-8165

Michigan Department of Community Health
MDCH

MDCH Zoonotic Disease and Special Projects Section
Mary Grace Stobierski, DVM, MPH, DACVPM – Manager, State Public Health Veterinarian
Kim Signs, DVM – Zoonotic Disease Epidemiologist
Erik Foster, MS – Medical Entomologist
Rebecca Reik, MPH – Globally Mobile Populations Epidemiologists
Jessie Clippard, MPH – CDC/CSTE Applied Epidemiology Fellow

Reportable Zoonotic Diseases in Michigan

The list of reportable diseases in Michigan includes many diseases that are transmitted by animals and arthropods to people (see table below). The Michigan Department of Community Health, Zoonotic Disease and Special Projects Section is responsible for statewide human case surveillance and cooperates in multi-agency ecologic and animal case surveillance. The following report will focus on several of the diseases listed in this table including: Arboviruses, Lyme disease, and Rabies.

Zoonotic Diseases in Michigan – 5 Year Table

Disease	2007	2008	2009	2010	2011	Total
Bird-Associated						
Psittacosis	2	0	0	1	0	3
Livestock-Associated						
Anthrax	0	0	0	0	0	0
Q Fever, acute	2	2	1	3	8	16
Q Fever, chronic	0	0	0	2	1	3
Mosquito Borne						
Dengue Fever	13	11	6	9	7	46
Encephalitis, California	1	0	0	2	1	4
Encephalitis, Eastern Equine	0	0	0	3	0	3
Encephalitis, St. Louis	0	1	0	2	0	3
Encephalitis, Western Equine	0	0	0	0	0	0
Malaria	23	17	32	34	35	141
West Nile Virus	17	17	1	29	34	98
Yellow Fever	0	0	0	0	0	0
Multi-Mode Zoonoses						
Brucellosis	5	1	10	4	2	22
Leptospirosis	3	1	0	0	1	5
Plague	0	0	0	0	0	0
Rickettsial Disease - Typhus	0	0	0	1	0	1
Tularemia	0	0	0	0	0	0
Public Health Pest						
Head Lice (Aggregate School Reporting)	0	440	2103	4063	5551	12157
Rabies and Animal Bites						
Animal Bite	55	562	2125	2388	3056	8186
Rabies, Animal	210	79	68	73	65	495
Rabies, Human	0	0	1	0	0	1
Rodent Borne						
Hantavirus	0	0	0	0	0	0
Hantavirus, Other	0	0	0	0	0	0
Hantavirus, Pulmonary	0	0	0	0	0	0
Tick Borne						
Ehrlichiosis, *Anaplasma phagocytophilum*	0	0	0	5	4	9
Ehrlichiosis, *Ehrlichia chaffeensis*	0	3	6	2	4	15
Ehrlichiosis, *Ehrlichia ewingii*	0	0	0	0	0	0
Ehrlichiosis, human other/undetermined	0	0	0	0	0	0
Encephalitis, Powassan	0	0	0	0	0	0
Lyme Disease	68	92	103	93	103	459
Rickettsial Disease – Spotted Fever	3	3	5	2	4	17
Total	**402**	**1229**	**4461**	**6716**	**8876**	**21684**

Michigan Zoonotic & Vector-Borne Disease
Surveillance Summary

Lyme Disease
May 2012

Lyme disease continues to be the most commonly reported vector-borne disease in the United States; approximately 30,000 cases were reported nationally in 2010[1]. Cases tend to be geographically focused in the northeastern and north-central United States. In Michigan, 106 cases were reported in 2011 with most Michigan exposures occurring in the Upper Peninsula.

The tick vector, *Ixodes scapularis* (Blacklegged tick), is now endemic in the western Lower Peninsula along Lake Michigan, and the highest tick populations occur among coastal communities. *I. scapularis* is also responsible for transmitting other diseases to humans including anaplasmosis and babesiosis, though both are rare in Michigan.

In 2012, MDCH staff will continue to conduct completeness reviews of Lyme disease case follow-up investigations and report annual findings to the public. Additionally, MDCH plans to continue field ecologic surveillance for Blacklegged ticks in the state with the help of its partners. Educational materials will continue to be made available to the public via the MDCH "Emerging Diseases" Website.

www.michigan.gov/emergingdiseases

106

There were 106 confirmed and probable cases of Lyme disease reported in 2011.

50%

Half of cases with a reported onset date occurred by mid-July.

24 to 48

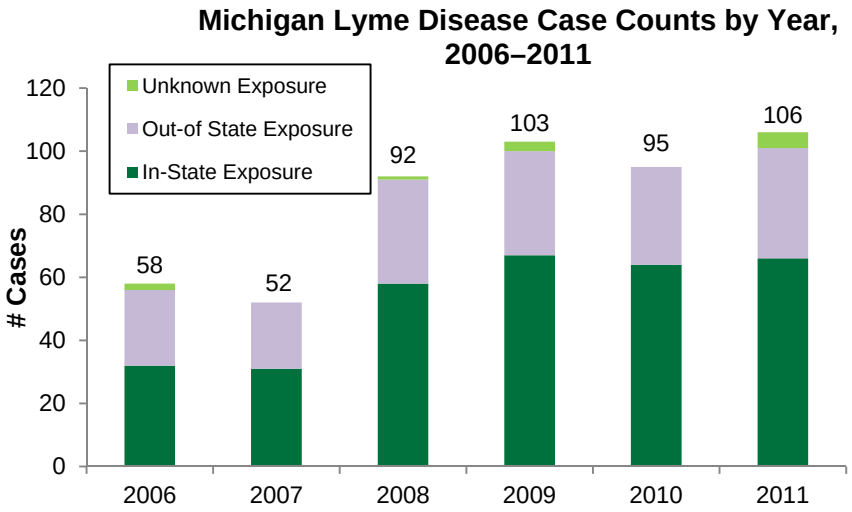
Removing ticks within 24 to 48 hours of attachment greatly reduces the risk of contracting Lyme disease.

[1]Source: CDC Reported Cases of Lyme Disease by Year, United States, 1996-2010.

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

Michigan Department of Community Health
MDCH

2011 Lyme Disease Data

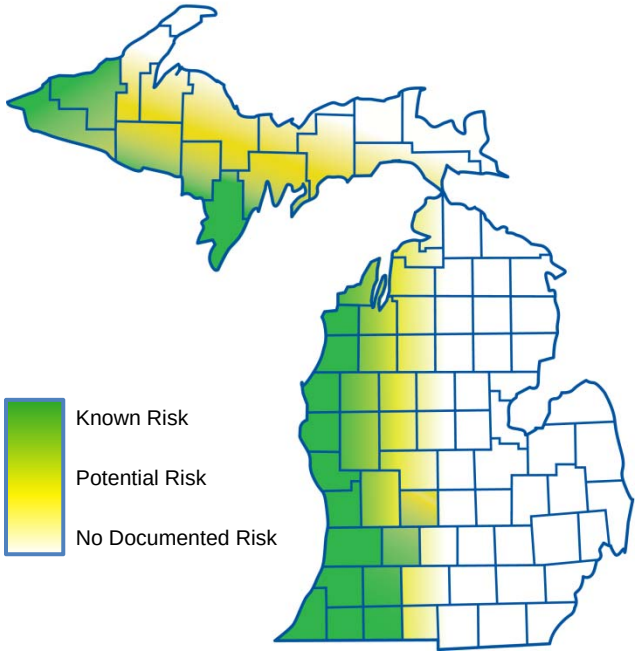


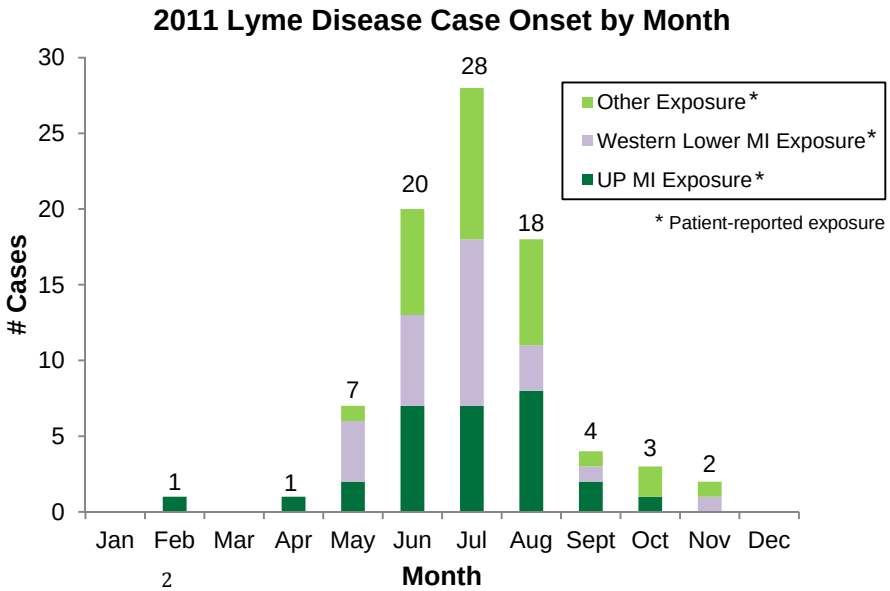
[1]Probable case definition was added in 2008

- A total of 106 probable and confirmed cases were reported to MDCH in 2011.
- In 2011, the number of reported Lyme disease cases increased slightly from 2010 but remained similar to previous years.
- The incidence rate in Michigan for 2011 was 1.1 cases per 100,000 persons.
- Incidence rates differ between the Upper Peninsula (17.5 cases per 100,000 persons) and the western Lower Peninsula (1.3 cases per 100,000 persons).

The map at right shows Michigan counties by Lyme disease risk. This map is updated periodically to reflect the newest field studies and human case surveillance information.

- Green indicates "endemic" counties where infected tick populations have been confirmed, and/or ≥2 confirmed human cases have been identified with local exposure.
- Yellow indicates counties bordering endemic areas which may pose risk; however, they do not meet endemic criteria.





[2]

Human case onset dates coincide with tick activity.

Adult ticks often have the highest infection rate and are active in the early-spring and the fall at temperatures above 45°F.

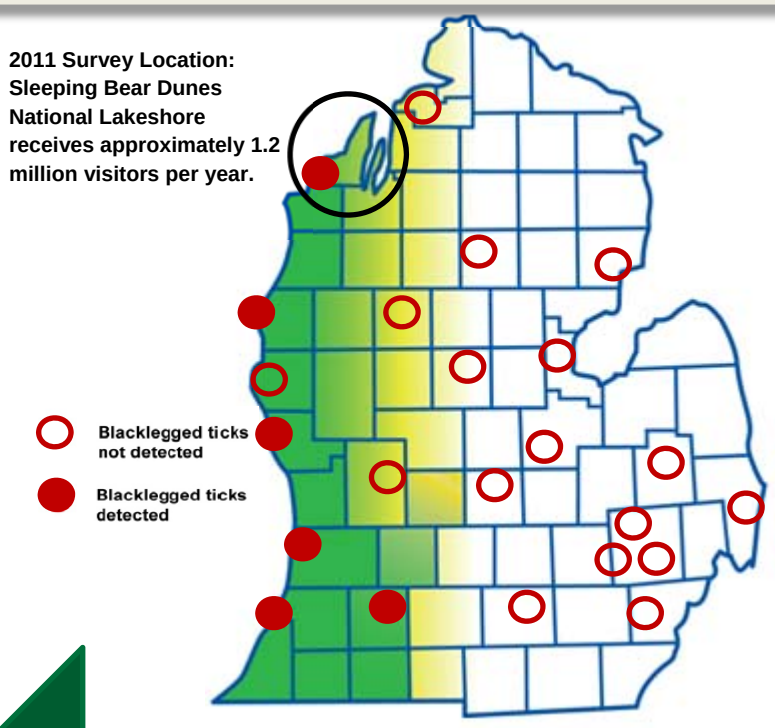
Nymphal ticks are responsible for a majority of human Lyme disease due to their small size (difficult to notice and remove promptly) and activity during the warmer months (May-August)

Special Projects

FIELDWORK AND COLLABORATION

In 2010, MDCH, in collaboration with researchers from Michigan State University, conducted a broad survey of tick populations across the state. The results of this survey indicate that vector tick populations continue to expand in the western Lower Peninsula, slowly moving eastward from the Lake Michigan shoreline communities. No populations of Lyme disease vectors were identified in Michigan's most densely populated regions from mid-Michigan to southeastern Michigan (see map below). As an extension of this work, MDCH continued tick population surveillance in 2011 with more focal surveys in state and national parks due to the large number of visitors to these areas annually.

Along with these efforts, a trail-head posting was developed for local use in parks and recreational areas to focus prevention information in regions of the state with heavy tick burdens. The sign describes the appearance of ticks, the actual size of ticks, tick-bite prevention measures, and directs the public to their local health department for further information. The signs are printed on metal to withstand the elements and are pre-drilled for attachment to posts near trails.



GUIDES AND PRINTED RESOURCES

Posters, pamphlets, and guides are available to download and print at http://www.michigan.gov/lymedisease. Limited quantities of printed materials and metal trailhead postings are also available. Please call MDCH Division of Communicable Disease to order these materials at 517-335-8165.

What Can Be Done?

Public Health Agencies can

- Monitor Michigan's tick populations
- Maintain Lyme disease surveillance system
- Offer tick identification and testing services to the public
- Make Michigan data publicly available
- Promote tick-borne disease prevention guidance

Health Providers can

- Review public health data regarding the risk of Lyme disease in Michigan
- Diagnose and treat infections using best practices
- Report cases promptly to your local health department
- Remind patients about the risk of Lyme disease in your area, and ways to prevent infections

Everyone can

- **Inform** yourself about where ticks can be encountered in Michigan
- **Prevent** tick bites by taking precautions and using EPA approved repellents on skin and clothing
- **Check** yourself and others for ticks regularly after spending time outdoors
- **Remove** ticks promptly and safely if you have been bitten
- **Submit** ticks you find on yourself or your pets for identification
- **Recognize** the symptoms of Lyme disease
- **Seek** prompt medical care if illness occurs after exposure to ticks

MDCH Lyme disease Website:
http://www.michigan.gov/emergingdiseases

Centers for Disease Control and Prevention Lyme disease Website:
http://www.cdc.gov/lyme

MDCH "Ticks and Your Health" Brochure:
http://michigan.gov/documents/emergingdiseases/resize_307382_7.pdf

Tick Identification and Testing Instructions:
http://michigan.gov/documents/emergingdiseases/Tick_testing_flow_chart_227376_7.pdf

Michigan Zoonotic & Vector-Borne Disease
Surveillance Summary

Rabies
May 2012

Rabies is a preventable viral disease of mammals most often transmitted through the bite of a rabid animal. In Michigan, the majority of reported cases each year occur in wild animals like bats, skunks, and foxes.

The rabies virus infects the central nervous system, ultimately causing disease in the brain and death. Exposure to the virus occurs when saliva from an infected animal contaminates broken skin or mucus membranes. Rabies is not transmitted though exposure to blood, urine, or feces of an infected animal.

For bats, another potential for exposure occurs when bats are found in rooms with sleeping individuals. In these cases, it is important not to let the bat go before consulting the local health department to determine if the bat should be tested for rabies.

Between January 1, 2011 and December 31, 2011, the Michigan Department of Community Health's Bureau of Laboratories (MDCH BOL) received 3,325 specimens for rabies testing, of which 3,171 could be tested. Of these, 65 (2.0%) were positive for rabies. In comparison, in 2010, 3,443 animals were submitted for testing, of which 3,300 could be tested and 73 (2.2%) were positive. Demand for rabies testing has increased in recent years, primarily due to an increase in bats submitted for testing.

5%

Five percent of bats submitted to the State Laboratory for rabies testing were infected with rabies.

August

The highest bat submission rate occurred in August, corresponding with increased juvenile bat activity. This is when most potential human exposures occur.

3,171

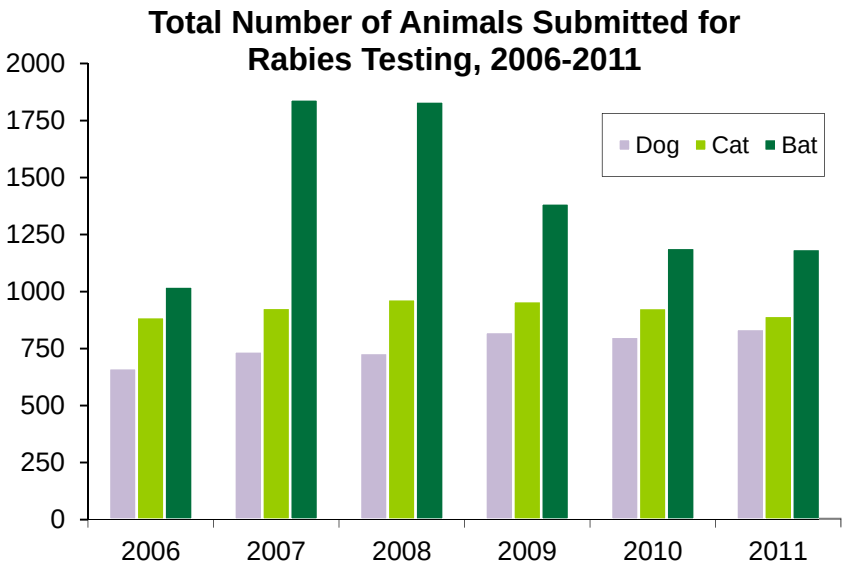
Over 3,000 animals were submitted for rabies testing in 2011.

www.michigan.gov/emergingdiseases

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

Michigan Department of Community Health
MDCH

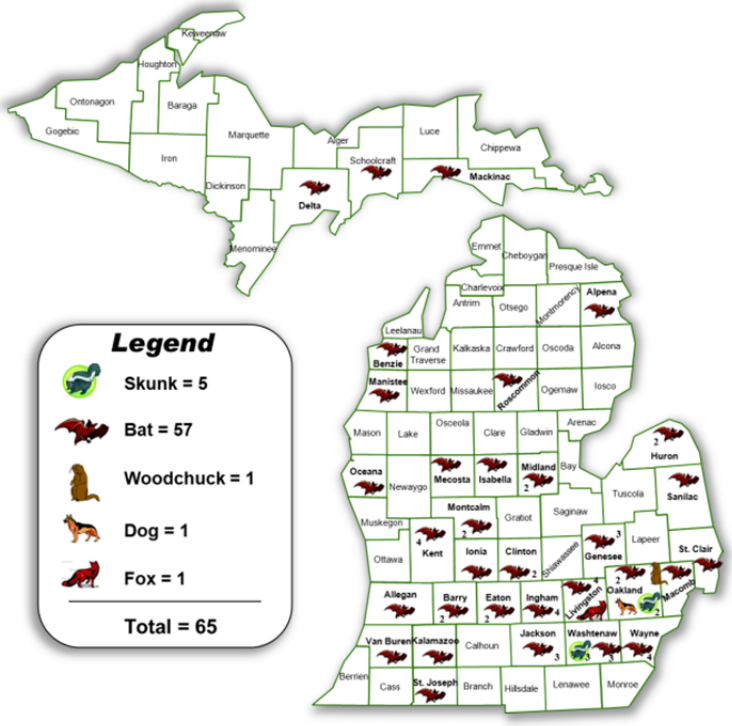
2011 Rabies Data

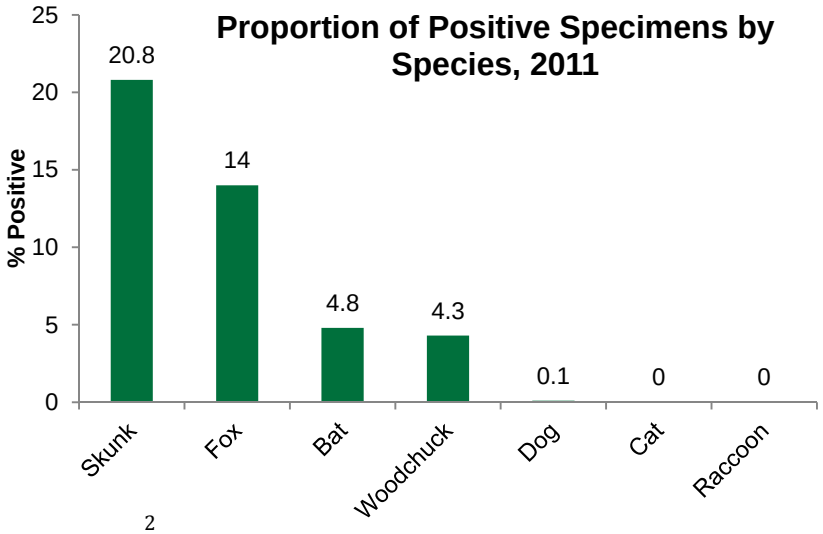


- 3,171 animals were tested for rabies by the MDCH Bureau of Laboratories.
- Bats were the most frequently submitted animal for testing (1,311) followed by 899 cats, and 847 dogs.
- 65 rabies-positive animals were reported in 2011.
- Positive animals included 57 bats, 5 skunks, 1 fox, 1 dog, and 1 woodchuck.

The map at right shows the location and species of rabies-positive animals in 2011.

While rabies positive terrestrial animals in Michigan are typically infected with the north central skunk-variant (NCSV) and confined geographically to the "thumb" area of the state, in 2011 there was one notable exception. In July, a strange-acting fox that attacked a gentleman in Livingston County was found to be rabid and infected with a bat-strain (associated with big brown bats) of rabies. The last time a terrestrial species in Michigan was detected with a bat strain of rabies was in 2009 when a fox from Oceana County tested positive with the same bat strain of rabies.





The chart at left shows the proportion of animals that tested positive for rabies in 2011 by species. While bats were the most frequently submitted species, just less than 5% were rabies positive.

Skunks had the highest proportion: of the 24 animals that were tested, 5 (20.8%) were positive.

In 2011, a sick-acting woodchuck that bit a homeowner in Oakland County tested positive for rabies. This is the first time rabies has been found in this species in Michigan. Woodchucks that bite people or unvaccinated pets should be submitted for rabies testing.

Special Projects

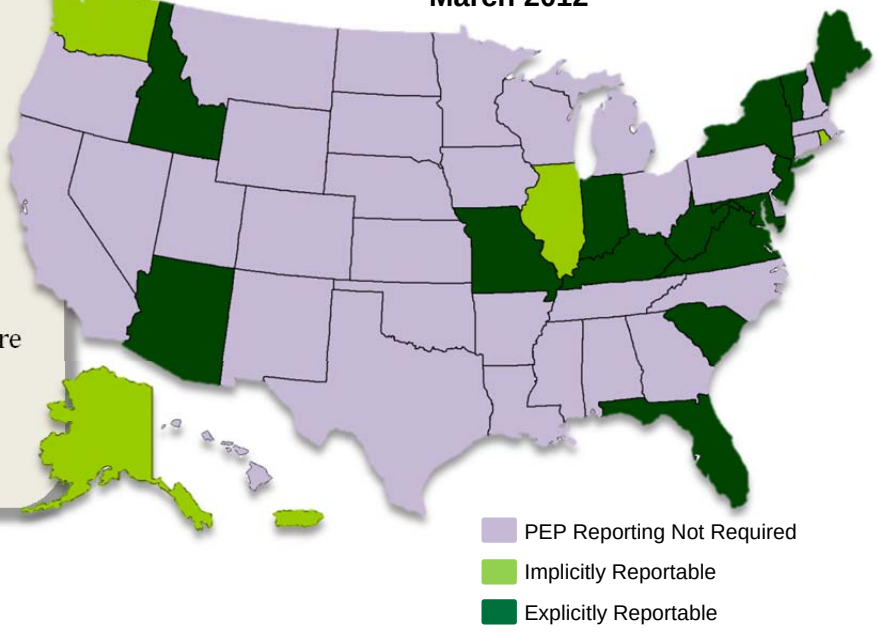
RABIES POST-EXPOSURE PROPHYLAXIS

As part of an effort to evaluate rabies post-exposure prophylaxis (PEP) treatment and patient completion rates in Michigan, a survey of local health departments (LHD) was conducted. Some of the results included:

- 80% of LHD's receive animal bite reports
- 9% provide rabies PEP
- 75% responded that it would help to have PEP reported into MDSS
- 13% provide PEP training to healthcare providers

Additionally, PEP reporting requirements in each state were surveyed and subsequently classified into one of three categories: explicitly reportable (PEP is a reportable condition), implicitly reportable (PEP not reportable, but a proxy, such as potential rabies exposure is reportable), or not reportable. These data are summarized in the map at right. Fourteen states explicitly require the reporting of rabies PEP.

Rabies Reporting Requirements by State, March 2012



GUIDES AND PRINTED RESOURCES

MDCH developed a poster that reminds people not to touch bats and to try to safely capture any bat found in the home in case rabies testing is advised (see page 5 – customizable PDF, choose title or make your own & add local contact information). Frequently, bats found in the home are immediately released upon discovery. In many of these cases, without a specimen to test for rabies, household members have to undergo costly rabies post-exposure prophylaxis treatment. The poster is available to Michigan local health departments, and can be customized with local contact information. It may also be found at www.michigan.gov/emergingdiseases.

The St. Clair County Health Department has compiled a list of patient assistance resources for those underinsured or uninsured individuals seeking rabies pre- or post-exposure prophylaxis. The information is broken down by biologics manufacturer and indicates the qualification criteria and contact information. The list is available at www.michigan.gov/cdinfo - under "Communicable Diseases A-Z – Rabies". Additional Patient Assistance Program information can be located at www.Rxhope.com.

What Can Be Done?

Public Health Agencies can

- Maintain a rabies surveillance system
- Provide rabies testing services to the public
- Provide consultation to health care providers and the public
- Make Michigan data publicly available
- Maintain relationships with animal control and animal health organizations
- Promote rabies prevention

Health Care Providers can

- Review epidemiology of rabies in Michigan
- Treat potential exposures using best practices
- Report animal bites to your local health department

Everyone can

- **Vaccinate** your pets against rabies and keep them up to date
- **Avoid** contact with wild or unfamiliar animals
- **Know** what to do if you find a bat in your home
- **Keep** a list of important phone numbers that includes animal control and your local health department
- **Seek** prompt medical care if you are bitten by an animal

Veterinarians can

- Vaccinate pets and livestock against rabies
- Educate your clients and the public about rabies prevention
- Ensure your rabies titers remain at protective levels

Learn More

MDCH Rabies Website:
http://www.michigan.gov/emergingdiseases

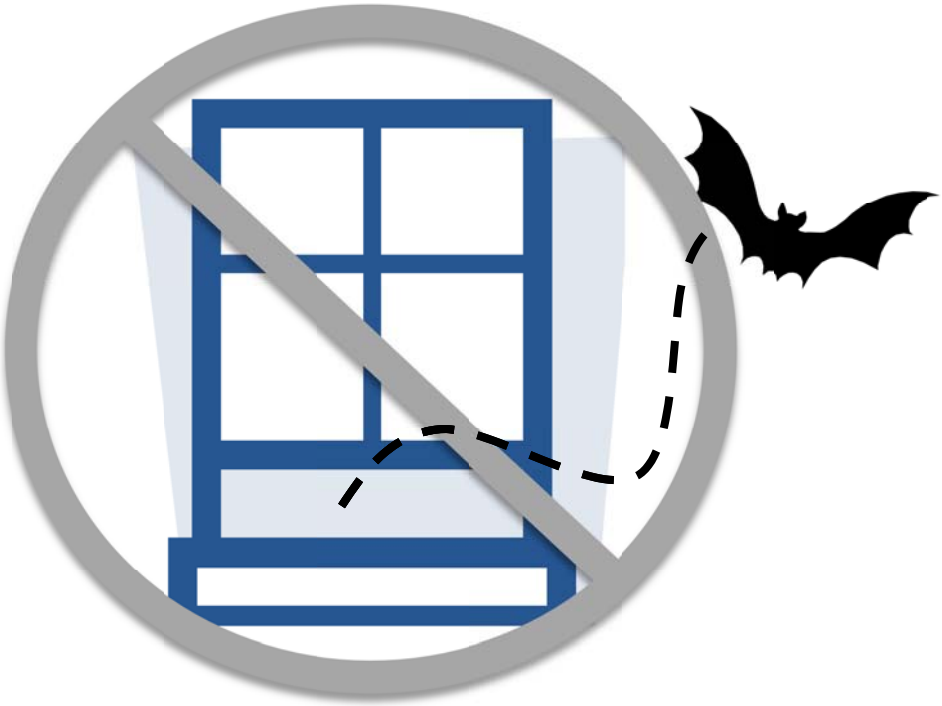
Centers for Disease Control and Prevention Rabies Website:
http://www.cdc.gov/rabies

National Association of State Public Health Veterinarians Rabies Compendium:
http://www.nasphv.org/Documents/RabiesCompendium.pdf

Maryland's Rabies Post-exposure Prophylaxis Basics Training for Healthcare Providers (CE available):
http://ideha.dhmh.maryland.gov/training/SitePages/rabies.aspx

New York's bat capture instructional video:
http://www.health.ny.gov/diseases/communicable/zoonoses/rabies/docs/catch_the_bat_high.wmv

CHECK IT OUT BEFORE YOU LET IT OUT!



What you should know

- Bats play an important role in nature but can also carry rabies.
- Rabies is a deadly virus that attacks the nervous system of mammals, including humans.

What you should do

- If you come into contact with a bat or find one in your house,
  DO NOT RELEASE IT!
- Have an adult safely capture the bat in a container (while wearing gloves), and immediately call your local health department for further assistance.

Contact your local health department:

ADD LOCAL INFO HERE

or go to www.michigan.gov/emergingdiseases for more information.

Michigan Zoonotic & Vector-Borne Disease
Surveillance Summary

Arboviruses
May 2012

[ar(thropod-)bo(rne) virus.]

n. Any of a large group of viruses transmitted by arthropods, such as mosquitoes and ticks, that include the causative agents of encephalitis.

Emerging vector-borne and zoonotic diseases present public health institutions with new challenges in surveillance and response capacity.

In Michigan, a proactive interagency collaborative mosquito-borne encephalitis surveillance program including state and local partners has existed for decades. To confront the emergence and reemergence of vector-borne diseases in Michigan, the group's aims are to: a) strengthen epidemiologic and field response capacity, b) utilize and provide state of the art laboratory diagnostic methods in the area of arboviral disease identification for human, avian, mammalian and insect specimens, c) improve public health disease reporting through ArboNET and community based web surveillance, and d) promote vector control and personal prevention strategies, consistent with published CDC guidelines.

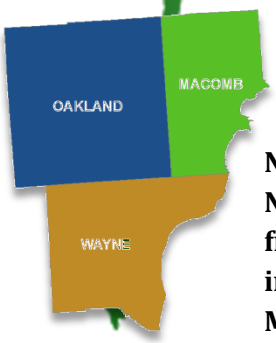
The Michigan Arbovirus Working Group held an exercise in February to assess the State Arbovirus Emergency Response Plan. The meeting brought together state agencies, local public health, and emergency preparedness coordinators from various jurisdictions to assess the need for updates or improvements to the plan. The meeting was a great success and highlights the value of a "One Health" approach to zoonotic disease issues, which combines the knowledge and experience of human and animal healthcare providers.

35

There were 35 confirmed and probable human cases of mosquito-borne arboviral illness in 2011.

96,978

96,978 mosquitoes from 8,462 pools were tested for infection with arboviruses in 2011.



73%

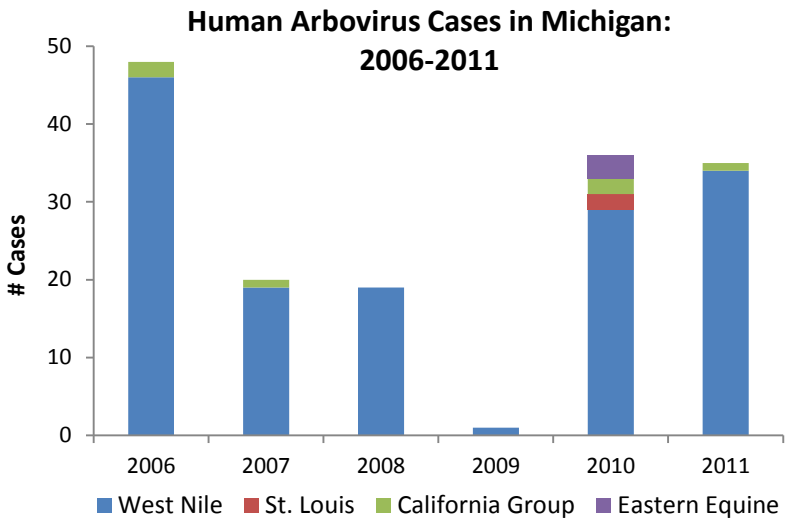
Nearly three-quarters of West Nile Virus cases in Michigan from 2002 to 2011 occurred in the tri-county, Detroit Metropolitan Area.

www.michigan.gov/emergingdiseases

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

Michigan Department of Community Health
MDCH

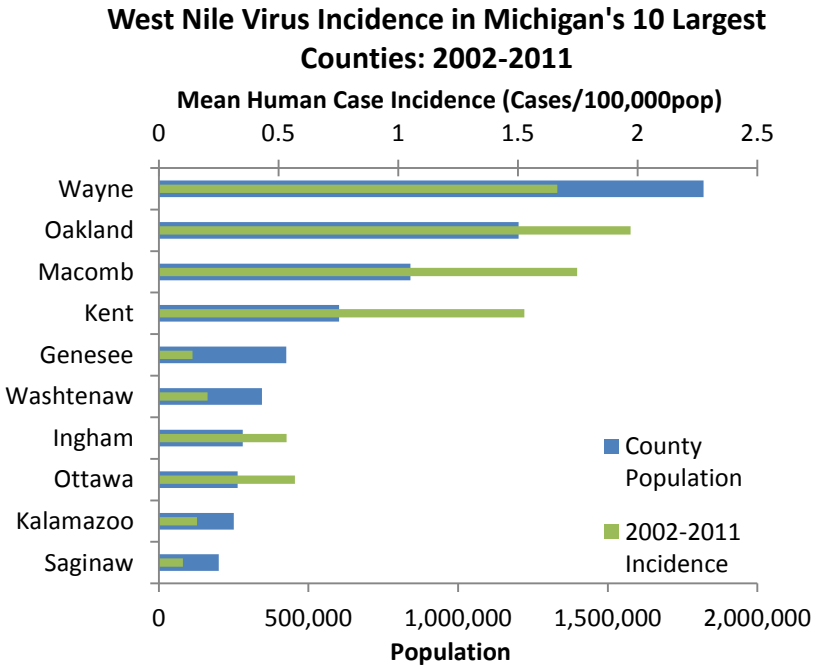
2011 Arboviral Disease Data

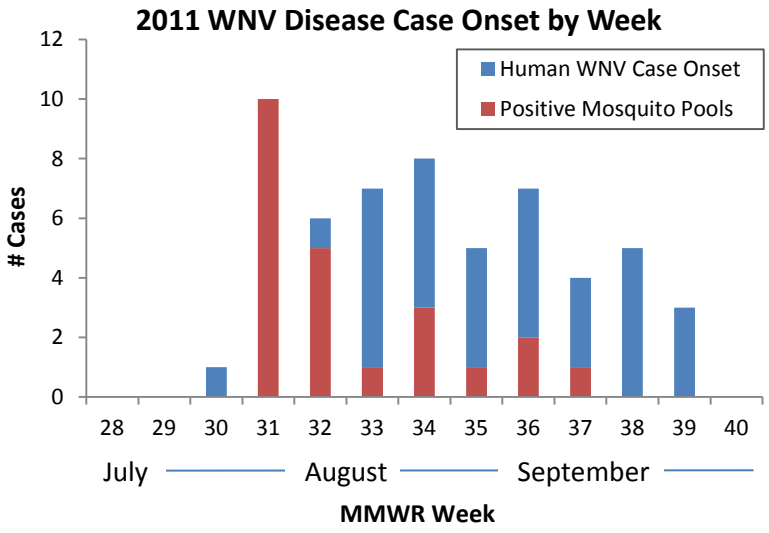


Michigan is endemic for a number of viruses that are transmitted through insect bites, particularly mosquitoes. These include West Nile virus, La Crosse Encephalitis virus, St. Louis Encephalitis virus and Eastern Equine Encephalitis virus. Human infections occur every summer in Michigan; however the level of risk from year to year is unpredictable.

The Michigan Department of Community Health Bureau of Laboratories provides comprehensive, state of the art, confirmatory testing for arboviruses endemic to Michigan. Patients hospitalized with meningitis or encephalitis in the summer in Michigan should be tested for arboviral infection. This testing is available free of charge to Michigan's healthcare providers, and can differentiate between the different arboviruses better than tests offered at commercial laboratories.

- In 2011, 35 human cases of arboviral disease were reported, including two deaths.
- Jurisdictions reporting human cases: City of Detroit, Macomb, Wayne, Ingham, Oakland, Eaton, Genesee (1 WNV and 1 La Crosse virus), Jackson, Kent, Monroe, and Shiawassee counties
- The age range for Michigan WNV cases was 28-85 years with an average of 59 years. Over half of the WNV cases in Michigan were 60 years and older.
- Of the WNV cases, 24 were males (71%) and 10 were females (29%).
- One case was identified through blood donor screening.
- Wayne, Oakland, and Macomb counties represent 39% of Michigan's population, and 73% of West Nile virus cases from 2002 - 2011.





- In 2011 human West Nile virus activity occurred from late-July through early-October; 50% of cases were reported by the week ending September 3.
- West Nile virus activity in Michigan is primarily urban as reflected above, and has been associated with 1940's to 1960's housing tracts. Many of these areas have aging sewage infrastructures which provide ample breeding habitats for *Culex* mosquitoes. Common urban bird species such as robins and sparrows act as amplifying hosts for the virus in the early mosquito season.
- Detecting arboviruses in mosquito pools most often precedes the detection of human illness in Michigan; currently mosquito surveillance is limited to several counties in Michigan's "thumb".

Special Projects

FIELDWORK AND COLLABORATION

Mosquito testing for arboviruses is conducted by several mosquito control districts in Michigan's "thumb" region. In collaboration with Michigan State University, almost 100,000 mosquitoes were tested for West Nile virus, St. Louis Encephalitis, La Crosse Encephalitis or Eastern Equine Encephalitis (EEE) viruses in 2011 (figure 1). Detection of positive mosquitoes in these areas prompted local agencies to respond to reduce mosquito populations, and to provide education to the public. No human cases were reported from these counties.

EEE activity was high in areas of southwest Michigan in 2010 with three human cases, and 133 suspect and confirmed horse cases. In collaboration with the Branch-Hillsdale-St. Joseph Health Department, and Michigan State University, three monitoring sites were established to detect EEE infected mosquitoes in an attempt to provide an early warning should EEE activity rise again.

Sites were established in areas that had historically experienced EEE outbreaks and do not have mosquito surveillance programs. One location in particular was the index equine case from the 2010 outbreak. The primary targets of the surveillance were the amplifying (bird to bird) mosquito vector, *Culiseta melanura*, and a presumed bridge vector (birds to mammals), *Coquillettidia perturbans* (figure 2).

Figure 1. Mosquitoes tested for West Nile virus in 2011 by zip code.

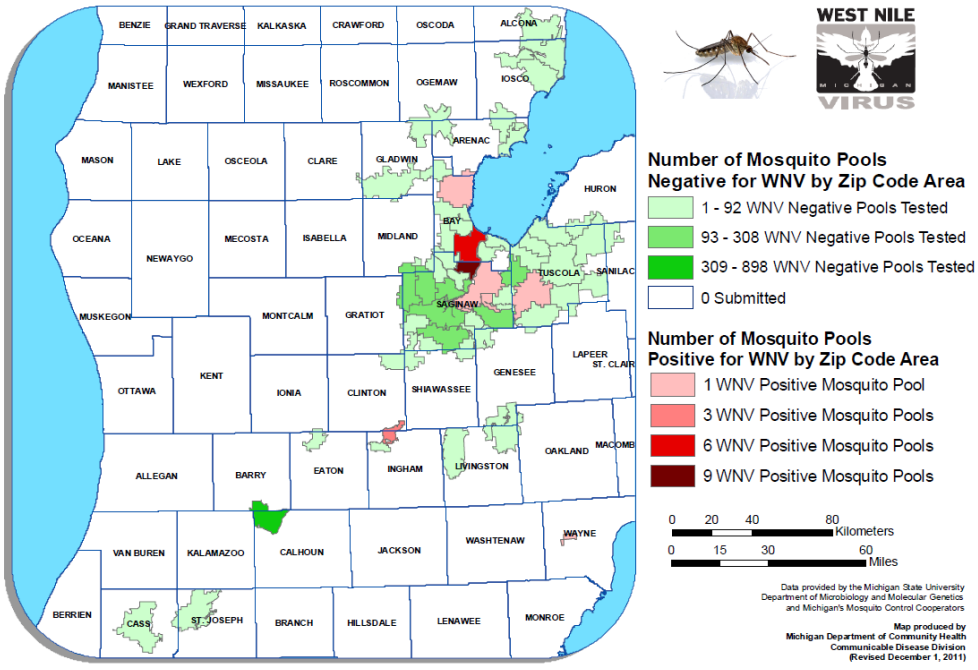
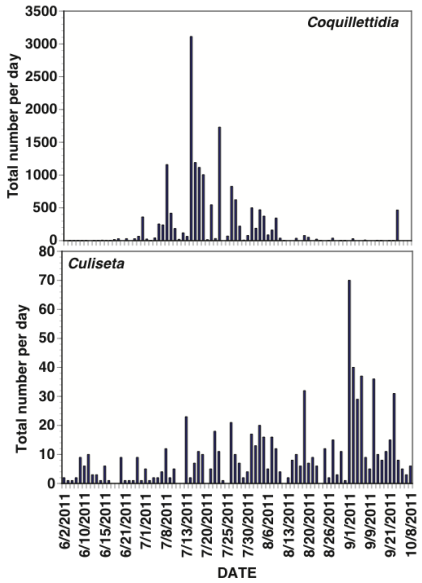


Figure 2. Trap collections of EEE target species by date in SW MI 2011. Of note, the early season amplifying vector, *Culiseta*, only showed a late season peak. This peak was likely too late to promote the cycle between birds and the bridge vector *Coquillettidia*.



INFORMATION AND RESOURCES

Pamphlets and guides are available to download and print at http://www.michigan.gov/westnile. Surveillance maps and tables for arbovirus activity in Michigan are also available and updated weekly during the arbovirus season. Please call MDCH Division of Communicable Disease to order these materials at 517-335-8165.

What Can Be Done?

Public Health Agencies can

- Monitor Michigan's mosquito populations
- Maintain a surveillance system for arboviral diseases
- Make Michigan data publicly available
- Promote arbovirus disease prevention guidance

Health Providers can

- Review public health data regarding the risk of arboviruses in Michigan
- Diagnose and treat infections using best practices
- Report cases promptly to your local health department
- Remind patients about the risk of arbovirus infection in your area and ways to prevent infections

Everyone can

- **Inform** yourself about the risk of contracting arboviruses:

  When:

  - June to October in Michigan
  - Dusk and dawn; most mosquitoes that transmit disease are active at these times

  Who:

  - Adults > 50 years of age are more susceptible to serious illness from all arboviruses
  - Children < 15 years of age are more susceptible to serious illness from EEE and La Crosse Encephalitis virus

- **Eliminate** standing water where mosquitos can lay eggs including: draining unused swimming pools, scrap tires, bird feeders, pet bowls, or other containers
- **Report** sick-acting or dead birds to your local authorities, or report online at www.michigan.gov/westnile
- **Prevent** mosquito bites when engaging in outdoor activities by using EPA approved insect repellents on skin and clothing

Learn More

MDCH West Nile Virus Website:
http://www.michigan.gov/emergingdiseases

Centers for Disease Control and Prevention West Nile Virus Website:
http://www.cdc.gov/ncidod/dvbid/westnile/index.htm

Michigan Zoonotic & Vector-Borne Disease

Surveillance Summary

Other Projects *May 2012*

Q Fever

Q Fever Outbreak Associated with Raw Milk Consumption
In 2011, Michigan Local Health Departments and the Michigan Department of Community Health identified a cluster of five cases of Q fever in people who consumed raw milk obtained from the same dairy. Q fever is caused by an unusual bacterium, *Coxiella burnetii*, that infects many species of animals. It is primarily considered an occupational risk for people who work with cattle, sheep and goats. The organism can be shed in large numbers in the birth fluids, milk, urine, and feces of infected animals and can survive for long periods in the environment. People are usually infected through contact with contaminated material or inhalation of contaminated dust. Most people who are infected do not become ill, but when they do, the symptoms are typically flu-like; fever, body aches and malaise. Severe illness such as pneumonia or hepatitis can occur. Without treatment, some people can develop a chronic infection. Pregnant women and people with immune-suppression or vascular disease are most at risk for severe illness. Raw milk is frequently implicated in human outbreaks involving dangerous pathogens such as E. coli, Salmonella, and Campylobacter. Pasteurization kills pathogenic bacteria, including Q fever.

Bed Bugs

Bed bug infestations continue to increase in Michigan's urban communities. One of the biggest challenges is educating the public on the bed bug issue, and providing recommendations for prevention and control. The U.S. EPA recently awarded a grant to the Michigan Bed Bug Working Group to develop resources for community education in southeastern Michigan over a two year period. This work is beginning with the formation of a Detroit coalition to assess the needs of communities in a focal downtown area. The coalition's mission will fall in line with the broader Healthy Homes initiative, and intends to train city inspection staff, health care providers, human services providers, and community outreach workers to take the message of proactive response and an integrated pest management philosophy into targeted neighborhoods. We expect that the products and the results of this project will be used as a model for future education and outreach programs throughout the state and the country.

Leptospirosis

In fall 2011, the Michigan Department of Agriculture and Rural Development (MDARD) reported a possible outbreak of canine leptospirosis in southeast Michigan. Leptospirosis is a zoonosis that can be spread to people through animals and the environment. There was a noted increase in the number of canine cases infected with a highly virulent serovar Icterhaemorrhagiae (Ictero) typically associated with rats. Utilizing a "One Health" approach, a team from Centers for Disease Control and Prevention (CDC), MDCH, and MDARD investigated and characterized the outbreak. The outbreak investigation discovered that the number of canine leptospirosis cases increased from 26 in 2010 to 61 in 2011. No human cases were identified. Rat trapping was conducted near 16 canine case homes. Of the five rats that were captured and tested, four were culture positive for leptospirosis and all four isolates were serovar Icterohaemorrhagiae.