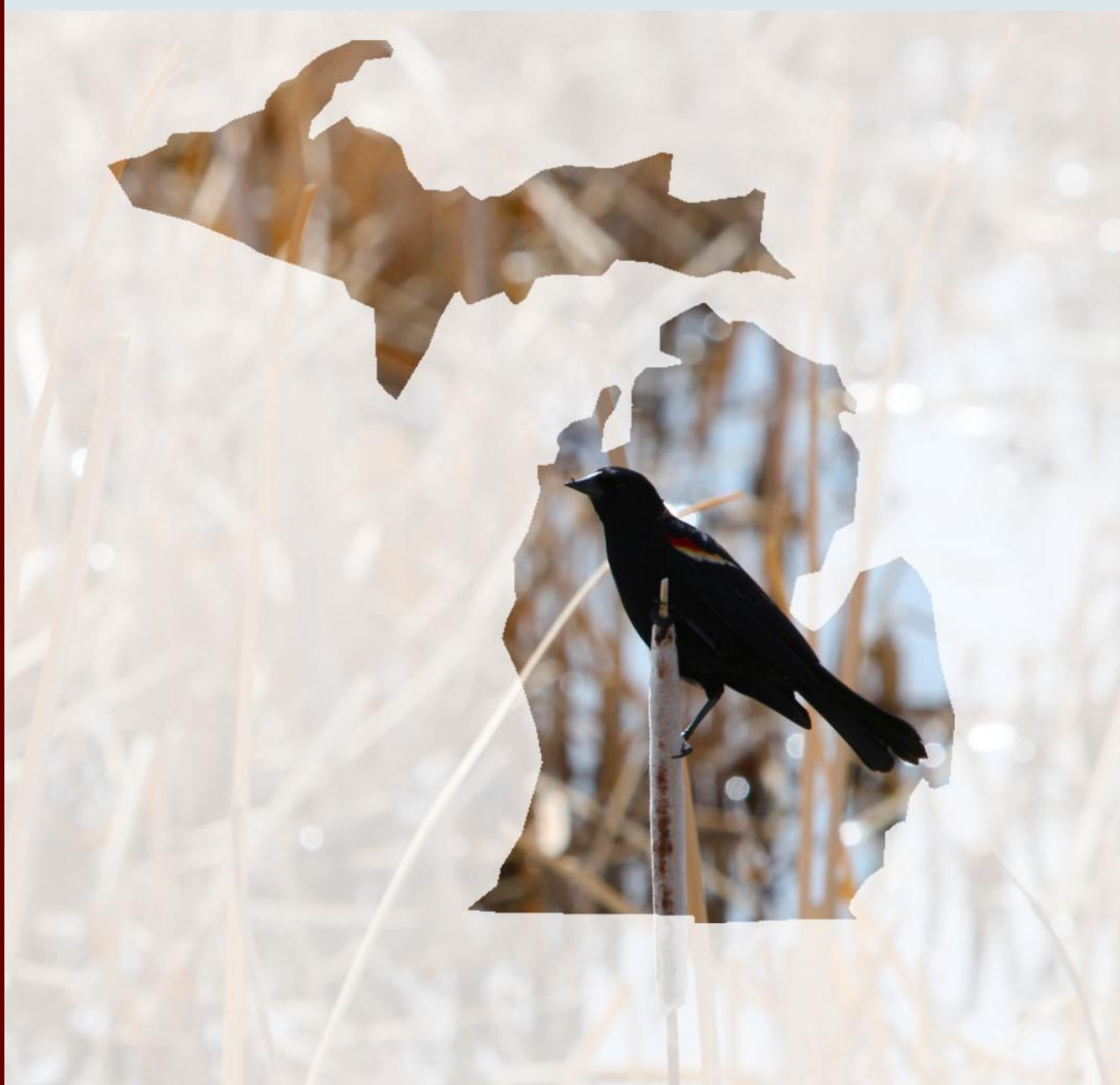


2019

Michigan Emerging and Zoonotic Disease  
**SURVEILLANCE SUMMARY**



# Michigan Emerging and Zoonotic Disease SURVEILLANCE SUMMARY 2019

Prepared by the Michigan Department of Health and Human Services  
Bureau of Infectious Disease Prevention  
Emerging & Zoonotic Infectious Disease Section (EZID)

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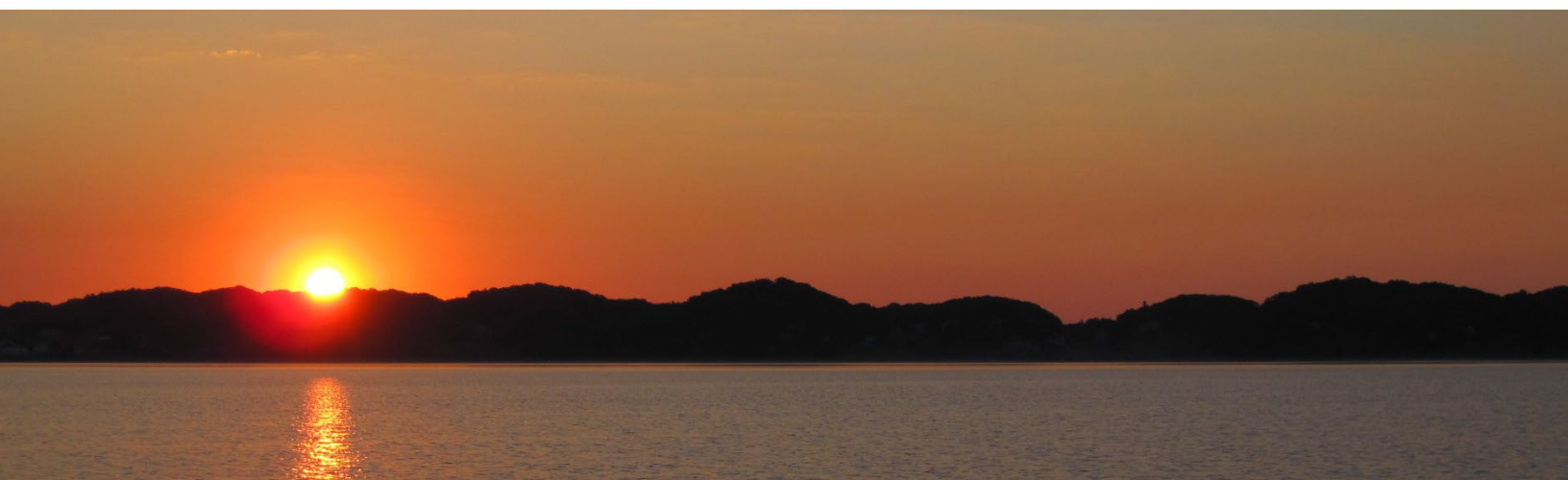
# INTRODUCTION

Zoonotic diseases are diseases that can be transmitted between animals and humans directly or through a vector (mosquitos, ticks, etc.). They can be caused by viruses, bacteria, parasites, and fungi. About 60% of infectious diseases in humans are transmitted from animals and 75% of emerging infectious diseases are zoonotic.

From West Nile Virus (WNV) to Lyme disease (LD), emerging zoonotic diseases in Michigan develop and are spread within complex cycles involving people, animals, vectors, and the environment. Thus, it is essential for healthcare providers, veterinarians, public health officials, and environmental scientists to work together in the identification, prevention, treatment, and control of disease. This collaborative initiative is known as One Health.

The Michigan Department of Health and Human Services (MDHHS) partners with federal, state, and local agencies as well as public universities to identify and define the geographic, environmental, and exposure risk of emerging diseases. The MDHHS is also dedicated to providing stakeholders with information on emerging diseases and best practices for surveillance, prevention, and control, including the Emerging Diseases website ([www.michigan.gov/emergingdiseases](http://www.michigan.gov/emergingdiseases)) and quarterly One Health webinars.

This report provides a summary of epidemiologic information for select zoonotic and vector-borne diseases in Michigan for 2019 and updates on special projects.



## Zoonotic Diseases in Michigan – 5 Year Table

\*Reported Cases in People\*

Disease	2014	2015	2016	2017	2018	2019
<i>Bird-Associated</i>						
Psittacosis	0	0	2	0	4	0
<i>Livestock-Associated</i>						
Anthrax	0	0	0	0	0	0
Q Fever, acute	2	2	1	3	4	5
Q Fever, chronic	2	2	3	1	1	0
Swine Influenza	0	0	13	2	3	1
<i>Mosquito Borne</i>						
Dengue Fever	6	23	16	11	10	23
Encephalitis, California (La Crosse)	0	1	0	0	0	2
Encephalitis, Eastern Equine	1	0	2	0	1	10
Encephalitis, St. Louis	0	0	0	0	0	0
Encephalitis, Western Equine	0	0	0	0	0	0
Malaria	19	21	43	45	29	25
West Nile Virus	1	18	42	40	104	12
Yellow Fever	0	0	0	0	0	0
Zika	0	0	69	9	0	0
Jamestown Canyon Virus	0	0	0	0	2	1
<i>Multi-Mode Zoonoses</i>						
Brucellosis	2	2	2	1	4	1
Leptospirosis	1	0	5	4	1	3
Plague	0	1	0	0	0	0
Rickettsial disease - Typhus	0	0	1	0	0	0
Tularemia	2	0	1	0	1	0
<i>Public Health Pest</i>						
Head Lice (Aggregate School Reporting)	5857	6415	7956	7389	6557	9436
<i>Rabies and Animal Bites</i>						
Rabies, Animal	41	37	42	39	76	58
Rabies, Human	0	0	0	0	0	0
<i>Rodent Borne</i>						
Hantavirus	0	0	1	0	0	0
Hantavirus, Other	0	0	0	0	0	0
Hantavirus, Pulmonary	0	0	0	0	0	0
<i>Tick Borne</i>						
Babesiosis, <i>Babesia microti</i>	2	2	2	3	3	1
Ehrlichiosis, <i>Anaplasma phagocytophilum</i>	4	7	7	15	14	12
Ehrlichiosis, <i>Ehrlichia chaffeensis</i>	3	5	8	4	7	5
Ehrlichiosis, <i>Ehrlichia ewingii</i>	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	129	152	228	291	262	404
Rickettsial Disease – Spotted Fever	1	2	12	13	16	10

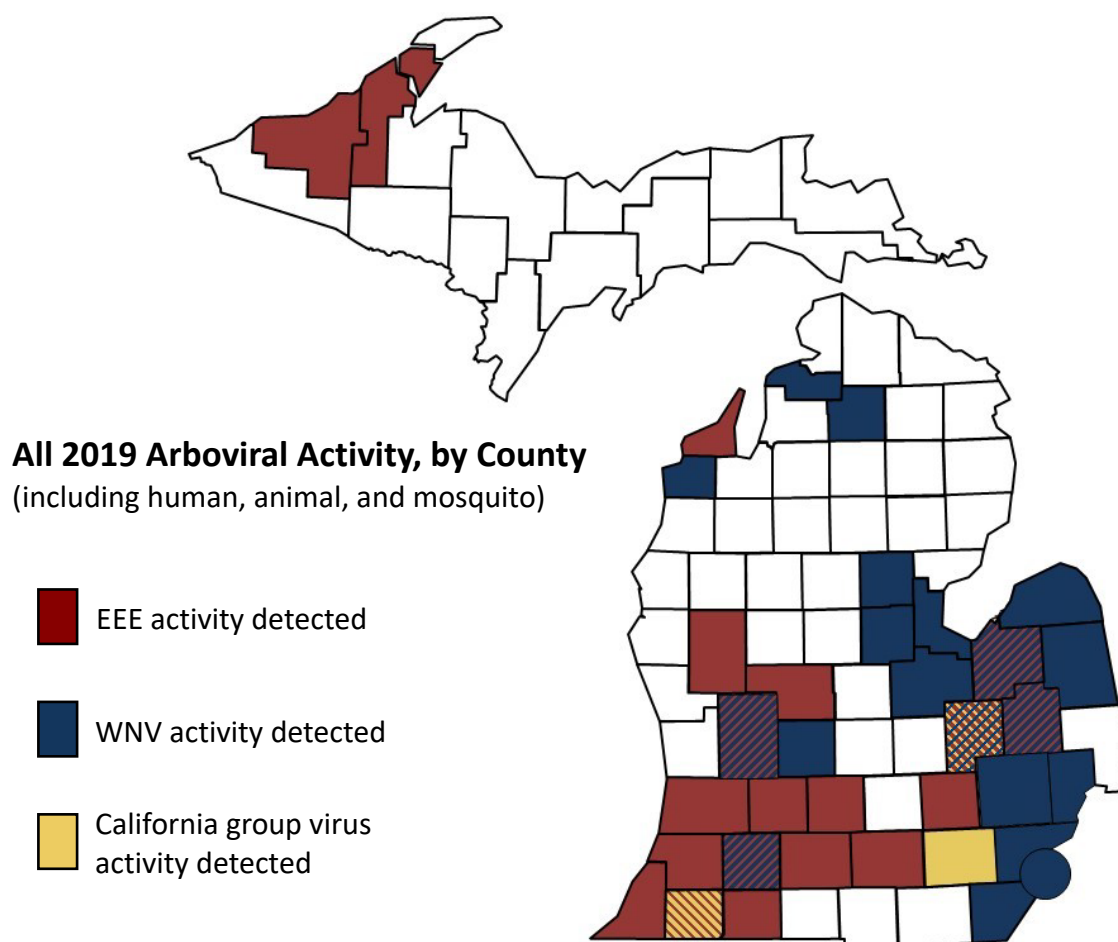
# ARBOVIRUSES



**Arboviruses**: any group of viruses that are transmitted by mosquitos, ticks, or other arthropods.

(Athropod-Borne viruses)

## 2019 ARBOVIRUS ACTIVITY



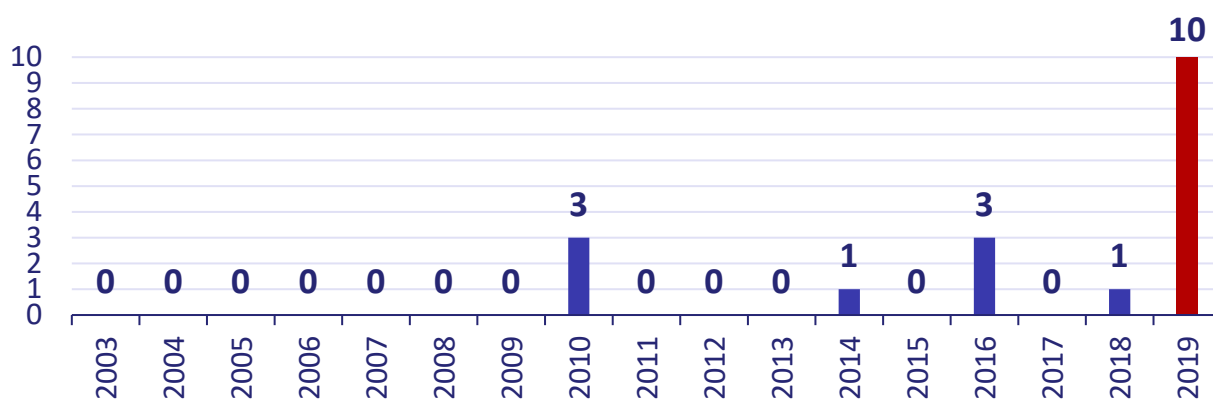
### 2019 Michigan Arbovirus Snapshot

Human EEE cases	10
Human WNV cases	12
Human California Group virus cases	3
WNV asymptomatic viremic blood donor	5
Animal EEE cases reported	50
Animal WNV cases reported	20
West Nile virus Positive Mosquito Pools	57
Total Number of Mosquito Pools Tested	1540
Total Number of Mosquitoes Tested	31995

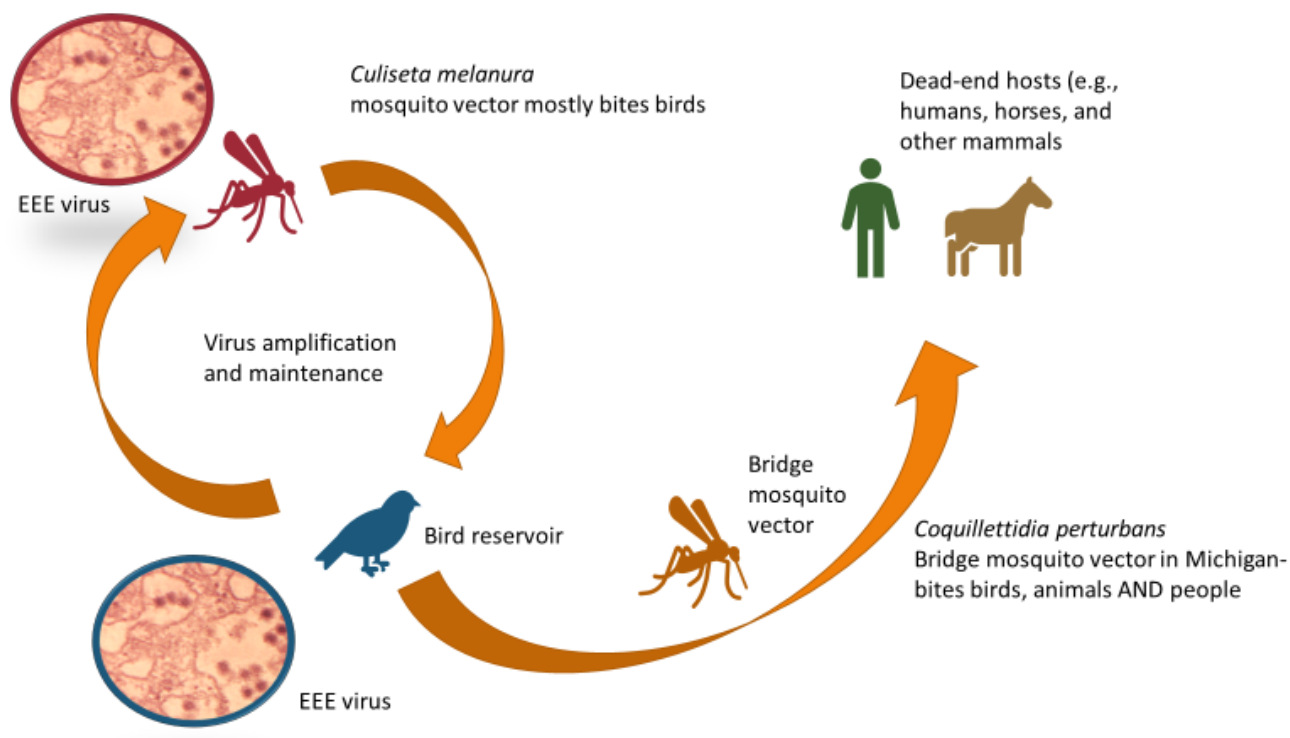
## EASTERN EQUINE ENCEPHALITIS

In 2019, Michigan experienced its largest ever outbreak of Eastern Equine Encephalitis (EEE) in humans. Ten humans were infected with EEE and six of them died. There were also 50 infected animals identified.

Annual Human EEE Cases, Michigan, 2003-2019



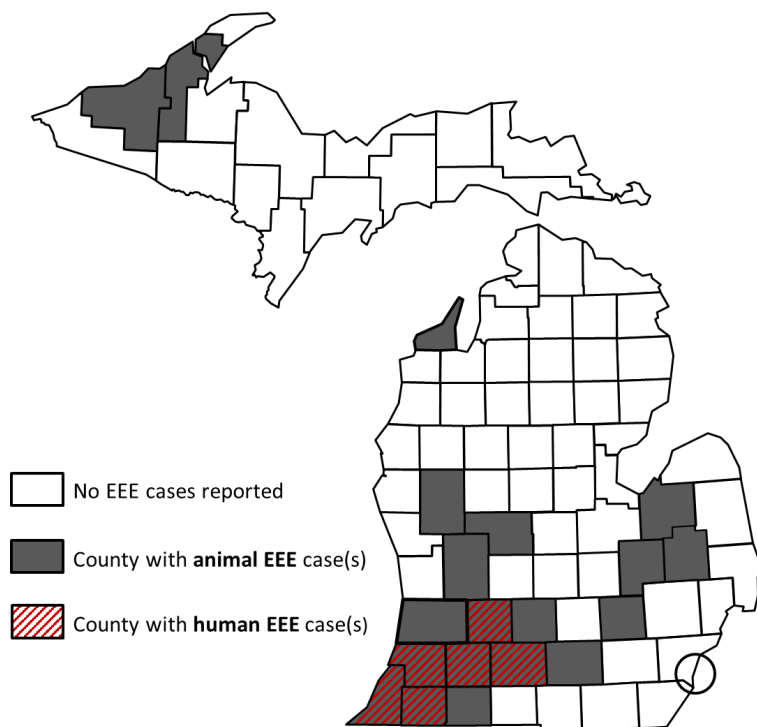
### EEE Transmission Cycle





## EEE Outbreak Response

### 2019 EEE Activity



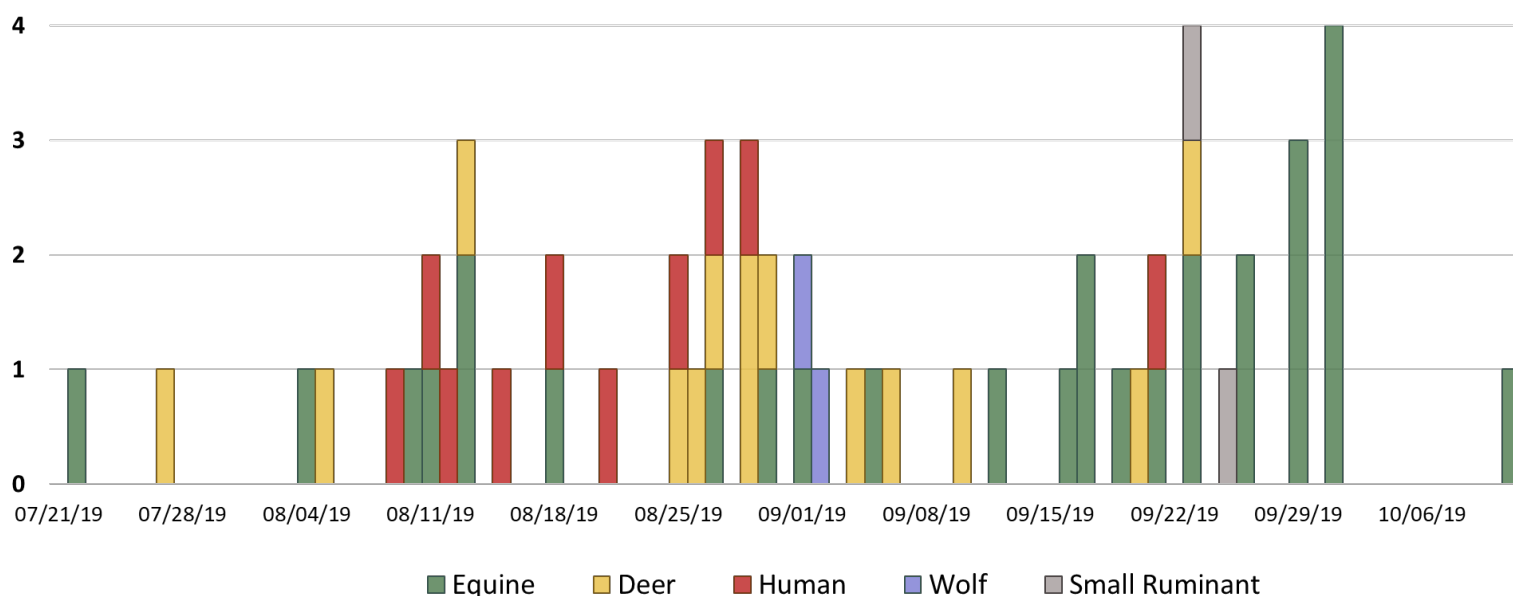
#### 10 Human cases including 6 fatalities

- Age range: 14-78 years
- Median age: 63 years
- Onset dates: Aug 9 – Sept 20

#### 50 Animal cases

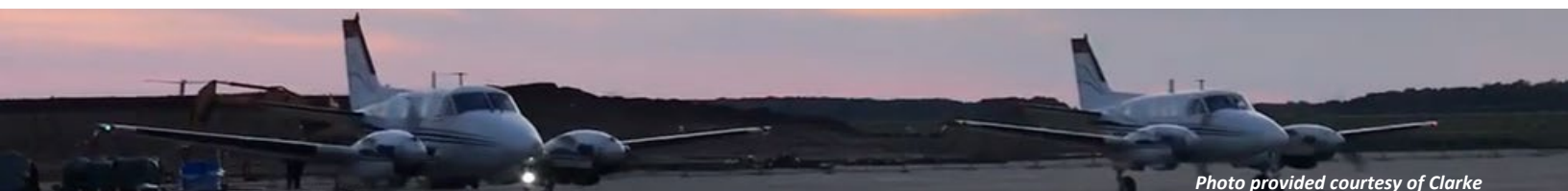
- Onset dates: July 22-October 11
- Animal species included horses, deer, wolves, and livestock.

### 2019 EEE Epidemic Curve



## 2019 EEE Aerial Treatment

- As of late September, human and animal cases were continuing to be identified
- Weather for Sept/Oct was predicted to be mild, allowing mosquitos to remain alive and active
- The species of mosquito that transmits EEE was still being caught in traps
- Determined that a public health emergency existed
- Identified a contractor to perform treatments, obtained needed permits and waivers for pesticide application
- Notified the public
- Residents of treatment areas given the chance to opt-out
- Aerial treatment was conducted from September 28 through October 10, as weather permitted



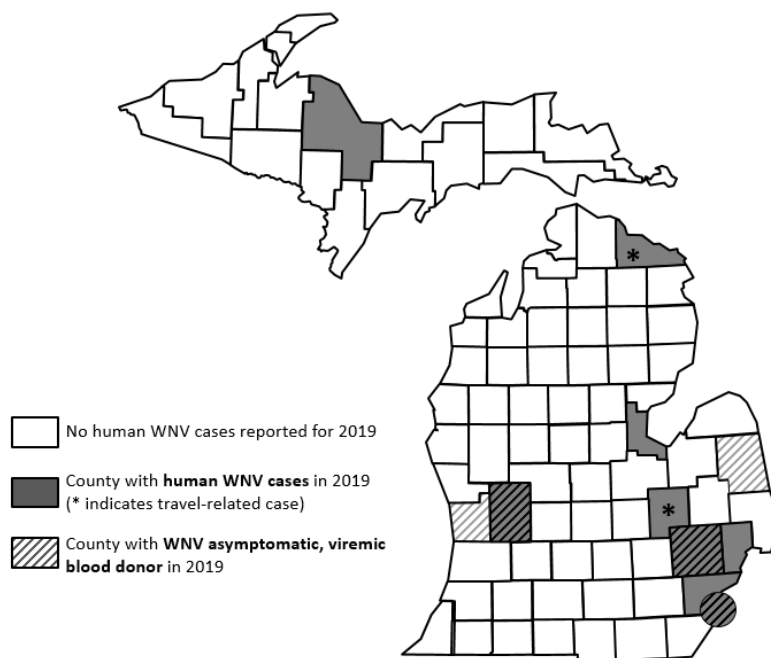
## EEE Outbreak Take-home Messages

- 2019 marked the most human cases Michigan has ever recorded in a single year
- Arboviral illnesses are reported every year in Michigan
- Outbreaks of EEE can occur in large areas of the state
- Risk varies each year
- Weather and geography influence both historical and regional risk
- More mosquito surveillance is needed to better anticipate disease risk
- Controlling mosquitoes & arboviral diseases is complicated work that requires community support and sustained funding
- Preventing human disease requires a One Health coordinated approach

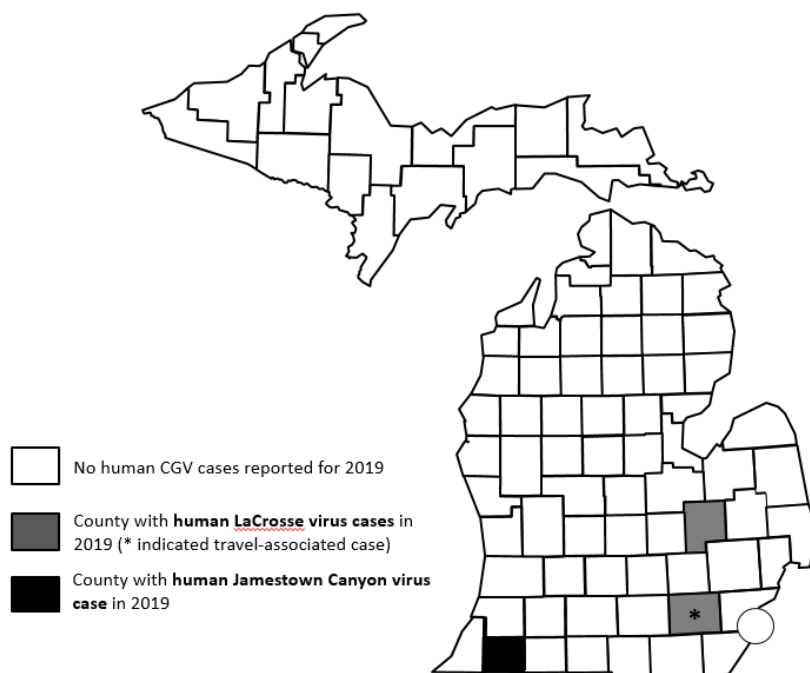
More information about the 2019 EEE Outbreak and Response, including a slide presentation, treatment maps, and a surveillance summary are available at [www.michigan.gov/EEE](http://www.michigan.gov/EEE).

## WEST NILE VIRUS

- 12 Cases including 2 fatalities  
2 travel-associated\*  
Age range: 5-80 years  
Median age: 58 years
- Onset dates: Aug 4 – Nov. 1
- 5 WNV positive blood donors
- Collection dates: Aug. 23-Sept. 19
- 31,995 mosquitos tested for WNV  
1,540 mosquito pools tested  
57 positive mosquito pools



## CALIFORNIA GROUP VIRUSES



- 3 Cases:  
1 Jamestown Canyon virus  
2 LaCrosse Virus  
1 travel-associated\*
- Age range: 12-59 years
- Median age: 42 years
- Onset dates: July 8 – Aug. 8

## 2019 VECTOR-BORNE DISEASE TRAINING

In the spring of 2019, the MDHHS EZID Section, along with academic partners at Michigan State University, held three two-day Vector-Borne Surveillance Workshops for environmental health professionals working at local health departments. These workshops were the first multi-day vector surveillance trainings of their kind offered to Michigan Local Health Department staff. Workshop instructors included experts from public health, vector-control agencies, and academia that have extensive experience in the epidemiology of insect-borne diseases, including tick and mosquito collection, identification, and control.

The goal of these workshops was to explain the essentials of maintaining a vector surveillance program and provide hands-on learning opportunities in program operations. Health Department staff gained experience in standard methods for field collection and identification of medically important ticks and mosquitoes, with a focus on emerging species of interest in Michigan. At the conclusion of the training, each jurisdiction received supplies to support their surveillance efforts including mosquito traps, tick drag cloths, collection equipment for tick surveillance, dissecting microscope and a flash drive with resources such as mosquito and tick identification keys, data sheets and reporting protocols, sample collection protocols, and a media toolkit.





## VECTOR-BORNE DISEASE SURVEILLANCE

MDHHS, in coordination with local health departments, conducts surveillance to assess the geographic distribution of various mosquito species and to evaluate the risk of arboviral disease transmission in Michigan. Several types of traps are set throughout the state to collect mosquitos, which are identified and tested to determine if they are positive for any arboviruses (WNV and EEE mainly). Institutions such as the Michigan Mosquito Control Association, the Midwest Centers of Excellence, and Michigan State University also conduct mosquito surveillance.

In the summer of 2019, MDHHS provided funding to twenty-five of Michigan's local health jurisdictions to participate in a Vector-Borne Disease Surveillance Project. This project aims to initiate a surveillance system capable of identifying populations of potentially invasive mosquitoes and ticks, including *Aedes albopictus*, which can transmit emerging arboviruses such as Zika virus, and *Ixodes scapularis* (blacklegged ticks) capable of transmitting Lyme disease and other emerging pathogens. Jurisdictions can tailor their efforts to meet the needs of the community they serve. These jurisdictions are putting into practice the skills acquired through the Vector Biology Workshop to contribute to what is known about the presence and distribution of insects of public health importance in Michigan.



**Many thanks to the counties who participated in the 2019 Vector-Borne Disease Surveillance Project!**

### Mosquito Breeding Sites



Female *Ae. albopictus* mosquitoes lay hundreds of eggs in water-filled containers. Examples of ideal breeding sites include tires, buckets of standing water, and tree holes.



### Surveillance Efforts

*Ae. albopictus* mosquito larvae collected from tires in Wayne County.



## WHAT CAN BE DONE?

### Everyone can....

- ➔ **Inform** yourself about where risk for contracting arboviruses is greatest (find up-to-date maps on the MDHHS MI Disease Mapper linked below)
- ➔ **Inform** yourself about when the risk for contracting arboviruses is greatest:
  - ✦ Summer
  - ✦ At dusk and dawn, mosquitoes are most active
  - ✦ Adults > 50 years of age are more susceptible to serious illness from WNV and EEE
  - ✦ 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
- ➔ **Report** dead birds to your local authorities
- ➔ **Protect.** Take precautions to prevent mosquito bites when engaging in outdoor activities

### Health Providers can....

- ➔ Review public health data regarding the risk of arboviruses in Michigan
- ➔ Diagnose and treat infections using best practices
  - ✦ Submit samples for arbovirus panel testing to MDHHS Bureau of Laboratories
- ➔ Report cases promptly to your local health department
- ➔ Remind patients about the risk of arbovirus infection in your area and ways to prevent

### 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

## UPDATED GUIDES AND PRINTED RESOURCES

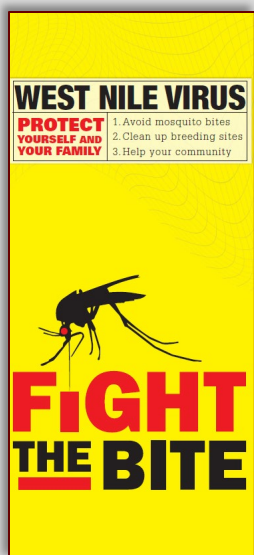
Posters, pamphlets, and guides are available to download, print and order at:

[http://www.michigan.gov/documents/emergingdiseases/Publication\\_Order\\_Form\\_357623\\_7.pdf](http://www.michigan.gov/documents/emergingdiseases/Publication_Order_Form_357623_7.pdf)

MDHHS West Nile Virus Website:  
[www.michigan.gov/westnile](http://www.michigan.gov/westnile)

MDHHS MI Disease Mapper  
[www.michigan.gov/MIDiseaseMapper](http://www.michigan.gov/MIDiseaseMapper)

Centers for Disease Control and Prevention Arbovirus Websites:  
[www.cdc.gov/westnile](http://www.cdc.gov/westnile)  
[www.cdc.gov/jamestown-canyon](http://www.cdc.gov/jamestown-canyon)  
[www.cdc.gov/EasternEquineEncephalitis](http://www.cdc.gov/EasternEquineEncephalitis)



# TICKBORNE DISEASES



## LYME DISEASE

Lyme disease (LD) is the most commonly reported vector-borne disease in the United States; over 33,000 confirmed cases were reported nationally in 2019. In the U.S., cases tend to be geographically focused in the northeastern and north-central United States, but LD is also endemic and expanding in Michigan. Of the 404 total cases in 2019, 360 were locally acquired, 36 were travel related, and 8 were not able to be classified. Most exposures occurred in the Upper Peninsula and western Lower Peninsula.

The tick vector, *Ixodes scapularis* (blacklegged tick), is endemic in portions of the Upper Peninsula and the western Lower Peninsula. In addition, the distribution of the blacklegged tick is expanding into new areas across the state.

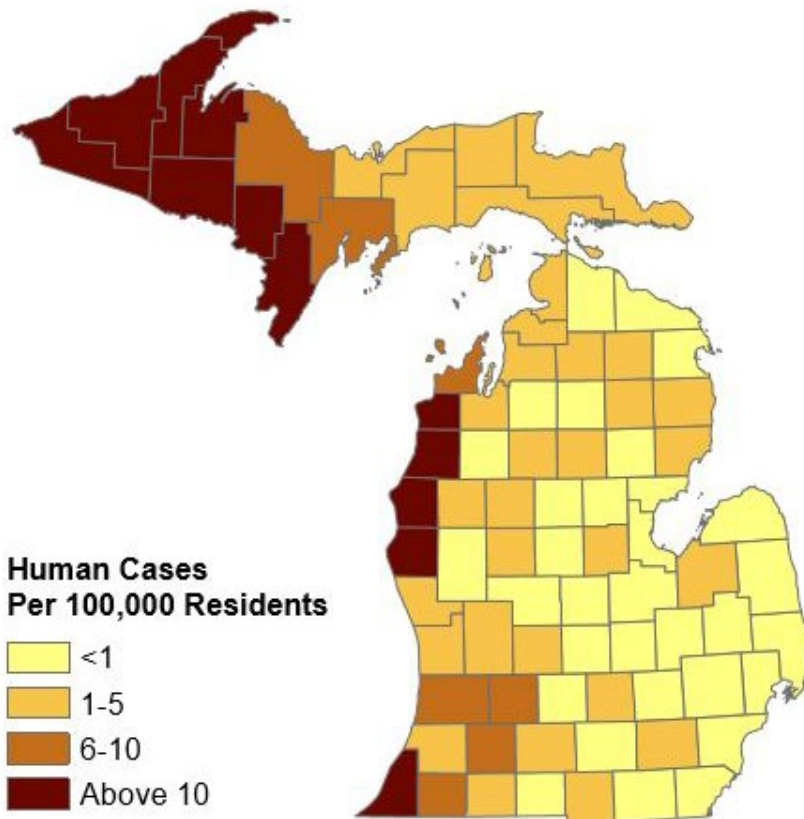
In 2019, MDHHS conducted human case surveillance and field ecologic surveillance for blacklegged ticks throughout the state with the help of its partners, including Michigan State University and sister state agencies. Educational materials will continue to be updated and made available to the public via the MDHHS Emerging Diseases website ([www.michigan.gov/emergingdiseases](http://www.michigan.gov/emergingdiseases)).

**404**



In 2019, 404 confirmed and probable human cases were reported with most Michigan exposures occurring in the Upper Peninsula and western Lower Peninsula.

### 5-Year Lyme Disease Incidence by County of Residence, 2014-2019



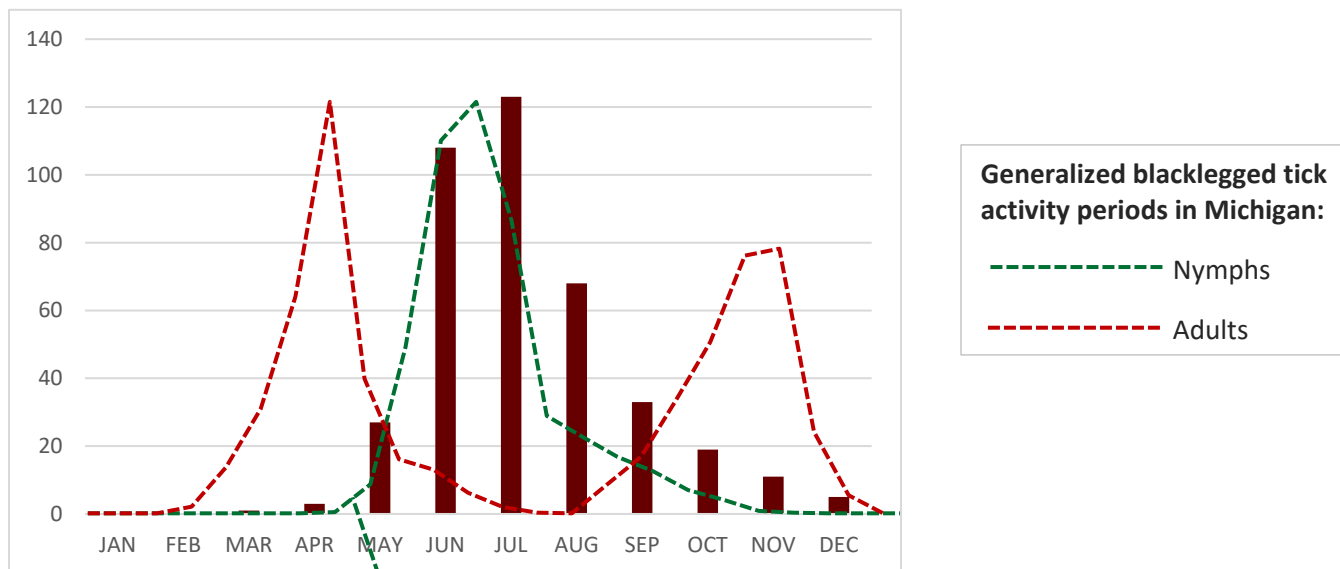
### Highest Rates of Lyme Disease Incidence (per 100,000 residents)

Dickinson	117
Menominee	56
Keweenaw	38
Ontonagon	36
Manistee	20

Map of the average number of human Lyme disease cases per 100,000 persons in each county from 2014 to 2019

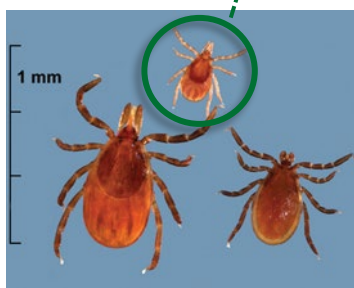


## Reported Lyme Disease Cases in Michigan: 2019

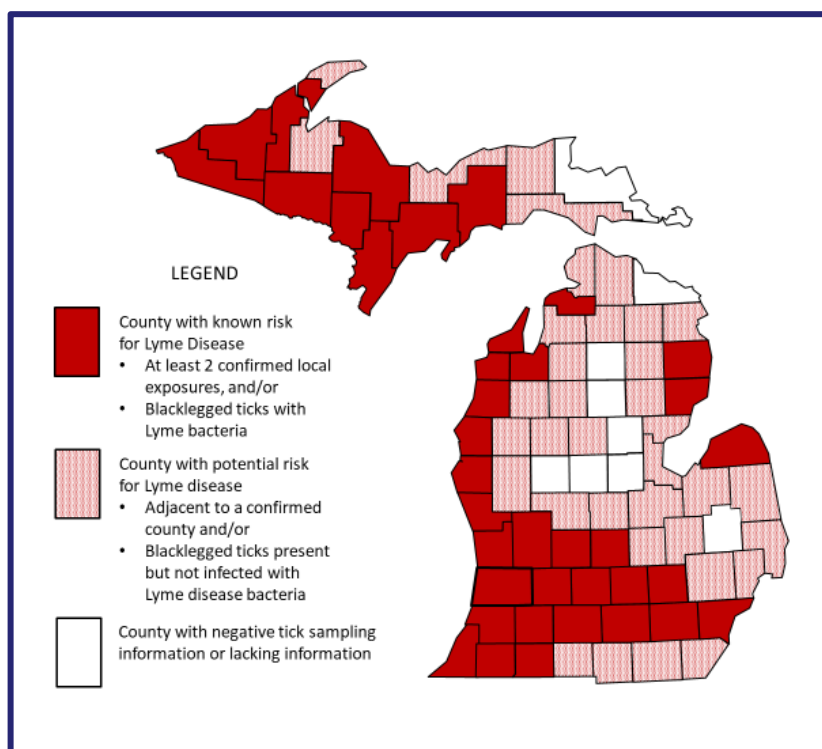


### Nymphs:

Peak transmission season for Lyme disease in Michigan (May through August) is associated with nymphal blacklegged ticks. Although the Lyme pathogen is more prevalent in adult ticks, bites from nymphs contribute more to Lyme disease transmission because nymphal ticks are smaller (about the size of a poppy seed). Nymphal ticks often escape notice long enough to attach to their human host and transmit the pathogen. Frequent tick checks are important during this time of year as prompt removal of ticks can prevent Lyme disease.



## Michigan Lyme Disease Risk Map: 2020



Map detailing the risk of Lyme disease in each county based on previously recorded presence of blacklegged ticks, presence of the Lyme disease bacterium, and confirmed local exposures

## STATEWIDE TICK SURVEILLANCE

Given that Michigan is an emerging Lyme disease state, increasing efforts to detect blacklegged tick populations and *B. burgdorferi* in the field is a priority. MDHHS and Michigan State University continued to conduct surveillance throughout the state in 2019.

### In 2019...



**>495 km<sup>2</sup> sampled**

For the presence of blacklegged ticks (*Ixodes scapularis*) across 75 field sites



**3,408 blacklegged ticks**

collected from May through July



**Pathogen testing delayed**

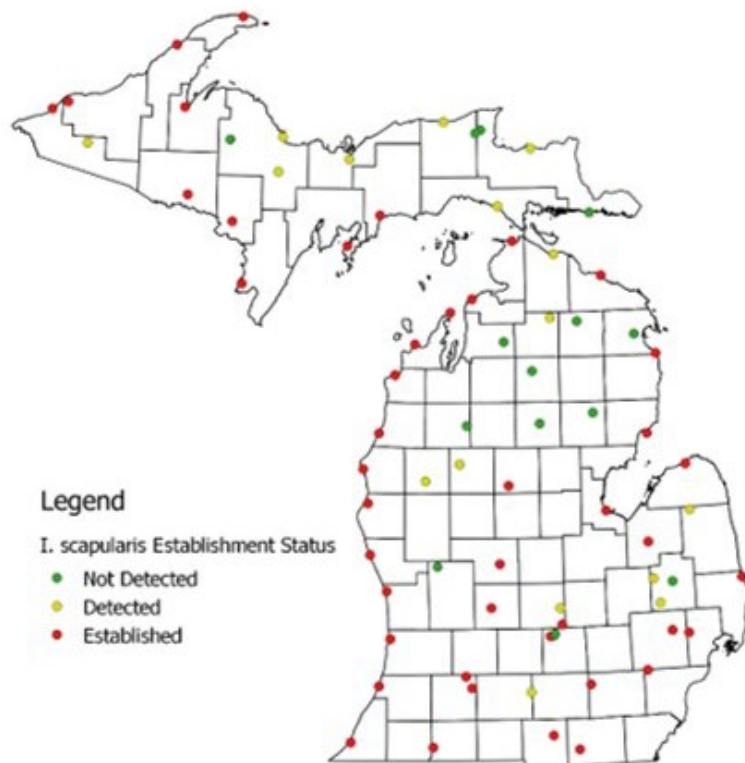
for disease-causing organisms at the CDC Vector-Borne Disease Laboratory in Ft. Collins, CO due to priority of COVID-19 testing



### In 2018

**506 ticks were tested and 15% of those were positive** for Lyme disease-causing bacteria (*Borrelia burgdorferi*). Approximately 6% of nymphs and 25% of adults collected were positive for *Borrelia burgdorferi*.

### 2019 Field Sites



Tick surveillance using a drag cloth

Blacklegged Tick collected on a drag cloth

## Citizen-Submitted Tick Program

Since 2017, MDHHS has been receiving, identifying, and testing ticks sent in by Michigan citizens. MDHHS identifies the species of ticks submitted by the public and sends the results to the submitter. Some of the ticks are sent for additional testing\* to determine if they carry the Lyme disease bacterium. The program was expanded in 2018 to allow citizens to email a picture of their tick to [MDHHS-Bugs@michigan.gov](mailto:MDHHS-Bugs@michigan.gov). In 2018, 857 ticks were submitted via mail to MDHHS for identification and testing, and an additional 152 tick photos were submitted via email. These numbers increased in 2019 with 1,070 ticks and 384 tick photos submitted.



\*Beginning April 1, 2020 ticks submitted for identification through this program will no longer be tested for the presence of pathogens.

### 2019 Submitted Ticks by Number & Species

Tick Species	Number of Tick Photos Submitted	Number of Ticks Submitted	Identified in 2019
American Dog Tick ( <i>Dermacentor variabilis</i> )	258	544	802
Blacklegged Tick ( <i>Ixodes scapularis</i> )	120	504	624
Lonestar Tick ( <i>Amblyomma americanum</i> )	6	22	28
<b>Total</b>	<b>384</b>	<b>1,070</b>	<b>1,454</b>

## OTHER TICK-BORNE DISEASES

Other tick-borne diseases have been identified in Michigan residents, which include:

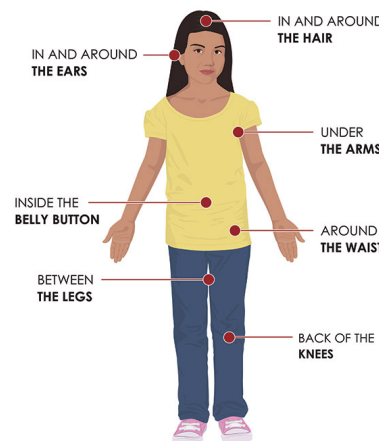
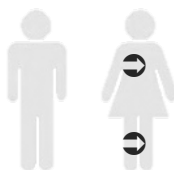
Tick-borne Disease	2019 Cases in Reported Michigan	Transmitted by (Species):
Anaplasmosis	15	Blacklegged Tick
Babesiosis	1	Blacklegged Tick
<i>Ehrlichia chaffeensis</i> *	5	Lone Star Tick
Tularemia	1	American Dog Tick and Lone Star Tick
Rocky Mountain spotted fever*	12	American Dog Tick

\*In most cases, *Ehrlichia* and Rocky Mountain spotted fever were acquired while traveling out of state.

## WHAT CAN BE DONE?

### Everyone can....

- ➔ Inform yourself about where ticks can be encountered in Michigan
- ➔ Prevent tick bites by using EPA registered 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



### Health Providers can....

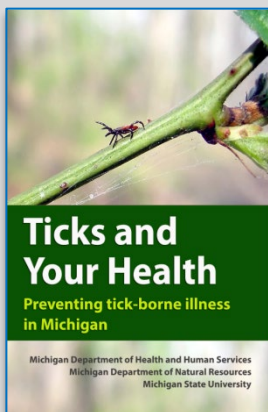
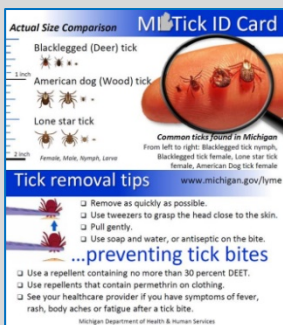
- ➔ Review public health data regarding the risk of Lyme disease in Michigan
- ➔ View the Michigan Lyme disease webinar: <https://www.michigan.gov/lymeinfo>
- ➔ Diagnose and treat infections using best practices
- ✦ Submit samples for Lyme disease testing to MDHHS Bureau of Laboratories
- ➔ Report cases promptly to your local health department
- ➔ Remind patients about the risk of Lyme disease in your area, and ways to prevent infections

### 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



## UPDATED GUIDES AND PRINTED RESOURCES



**Tick ID Cards** are now available for order. This pocket-sized resource provides information on how to identify common Michigan ticks, proper tick removal, and preventing tick bites.

The **Ticks and Your Health** brochure has been updated to include the most up-to-date information about Michigan ticks and tickborne diseases and is now available online and to order.

Posters, pamphlets, tick submission kits, and guides are available to download, print and order via the Communicable Disease Division's publication order form at: [www.michigan.gov/cdinfo](http://www.michigan.gov/cdinfo)



# WATERBORNE DISEASES



## HARMFUL ALGAL BLOOMS

Cyanobacteria (also known as blue-green algae) can form blooms on water surfaces that are not visually pleasing, smell, and can interfere with recreational activities. Some cyanobacterial blooms produce cyanotoxins that can cause illness and even death in humans and animals; these are known as harmful algal blooms (HABs).

Globally, HABs are increasing in frequency and duration, with most researchers citing climate change, nutrient pollution, and invasive species as causes. Cyanobacteria usually “bloom” when water temperatures are warm, the water surface is calm, and sunlight is available. In Michigan, HABs usually occur in June through October. HABs can last for as little as one day or as long as several weeks. Since 2017, 48 Michigan counties have had 95 waterbodies with suspect and confirmed HABs.

HABs tend to occur in patches throughout a lake, or even in one localized area, often along windswept shorelines. They can be a variety of colors and textures and can look like scum, spilled paint, foam, or discoloration of the water. Many are bright green with a “pea soup” appearance. Some blooms will turn light blue as they die off.

Humans and animals can become sick from contact with HABs. Swallowing water with cyanotoxins can cause abdominal pain, nausea, vomiting, and diarrhea. Contact with cyanobacteria may cause irritation, leading to rashes, runny eyes and noses, or asthma-like symptoms. Frequently swallowing water with cyanotoxins can damage the nervous system, liver, or kidney, which can cause weakness, numbness, dizziness, or difficulty breathing.

Many local, state, and federal organizations collaboratively respond to cyanobacterial blooms. In Michigan, the Department of Environment, Great Lakes, and Energy (EGLE) gathers bloom reports, conducts field visits, and collects water samples for testing conducted at the MDHHS Bureau of Laboratories. MDHHS and local health departments coordinate to assess public health risks, communicate results, and investigate human illnesses. Animal illnesses are investigated by the Department of Agriculture and Rural Development (MDARD). These agencies and other partners coordinate this work through the Michigan Interagency Harmful Algal Bloom Workgroup.

### Harmful Algal Blooms:




### NOT Harmful Algal Blooms:




Photos courtesy of Michigan Department of Environment, Great Lakes, and Energy

## WHAT CAN BE DONE?


### Everyone can....

- 
- **Know** what HABs do and do not look like (see previous page for examples).
  - **Report** suspect algae blooms or bloom-related illnesses to EGLE by calling 1-800-662-9278 or e-mailing [AlgaeBloom@Michigan.gov](mailto:AlgaeBloom@Michigan.gov). If available, pictures of suspected blooms are very helpful.
  - **Seek** medical care if you, your family, or your pet become sick after swimming or contact with algae.


### Health Care Providers can....

- 
- **Educate** yourself on symptoms ([www.cdc.gov/habs/pdf/habsphysician\\_card.pdf](http://www.cdc.gov/habs/pdf/habsphysician_card.pdf)) and ask patients about potential water exposures.
  - **Educate** patients about the risk of HABs.
  - **Report** any suspected HAB-related illnesses to your local health department, and consult with state or local public health on cases that are uncertain.

### Veterinarians can....

- 
- **Educate** yourself about clinical presentations of HABs and ask clients about potential exposures.
  - **Educate** your clients about the risk of HABs.
  - **Collect** clinical specimens and conduct necropsies on suspected HAB cases.
  - **Report** HAB illness in pets and livestock to MDARD at 1-800-292-3939.

### Public Health Agencies can....

- 
- **Report** suspected algae blooms, or bloom-related illnesses to EGLE by calling 1-800-662-9278 or sending an e-mail to [AlgaeBloom@Michigan.gov](mailto:AlgaeBloom@Michigan.gov).
  - **Respond** to HABs by posting signage, issuing appropriate advisories, and providing information to community stakeholders.

### Michigan Dog Deaths Due to Cyanotoxins

In July 2019, a citizen reported that five of his dogs had been sick or had died. Three dogs had symptoms consistent with poisoning (vomiting, neurologic signs, rapid deterioration); two dogs had sudden deaths. All dogs had contact with the citizen's private pond before their illnesses, so cyanotoxins were the suspected cause.

Several state and local agencies, including the MDHHS EZID Section, conducted interviews and site visits. No algal blooms were noted at the pond.

Pond water collected in July was negative for cyanotoxins; however, two water samples from August, both collected from deeper in the pond, tested positive for the cyanotoxin anatoxin-a at the MDHHS lab. The dogs' symptoms were consistent with anatoxin-a exposure.

The positive samples also contained *Oscillatoria* cyanobacteria, a benthic (bottom-dwelling) cyanobacteria known to produce anatoxin-a.

This investigation was the first documented animal toxicosis from benthic cyanobacteria in Michigan and highlighted Michigan's collaborative approach to harmful algal blooms.

**Fun Fact:** Data from Michigan algal blooms is entered into the national OHHABS reporting system to contribute to surveillance and research.



## RESOURCES

State of Michigan Harmful Algal Bloom website: [www.michigan.gov/habs](http://www.michigan.gov/habs)

Centers for Disease Control and Prevention's Harmful Algal Bloom-Associated Illness website: [www.cdc.gov/habs/](http://www.cdc.gov/habs/)

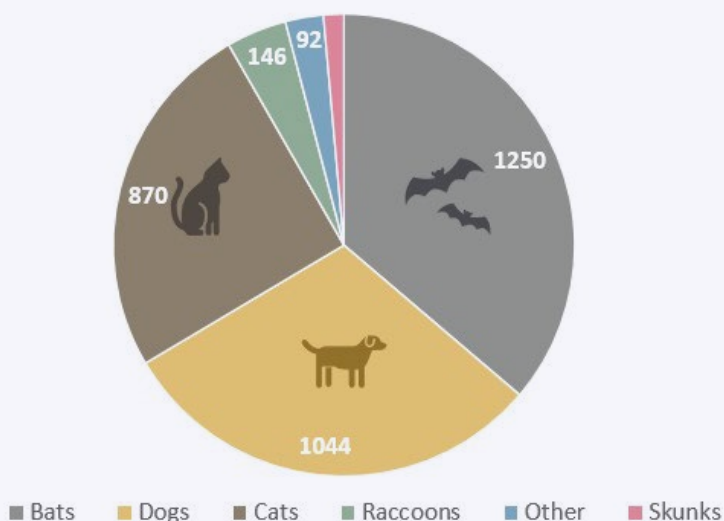
# RABIES



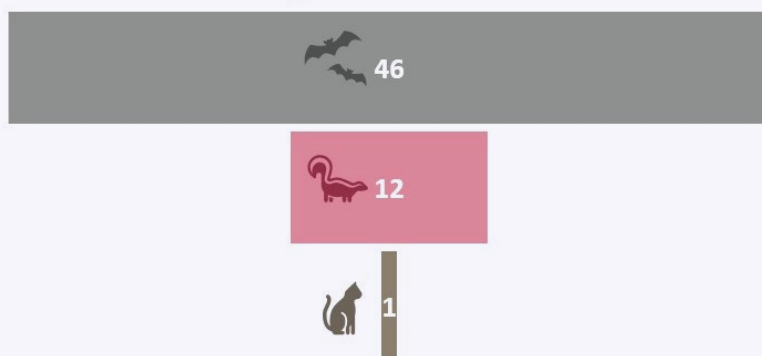


## RABIES

Animals Tested for Rabies at BOL in 2019



Animals Testing Positive for Rabies in 2019



Rabies is a deadly but preventable viral disease of mammals most often transmitted through a bite from an infected animal. The rabies virus is transmitted when saliva from an infected animal is exposed to broken skin or mucous membranes. Rabies infects the central nervous system, which causes disease in the brain and death in almost 100% of symptomatic cases.

In Michigan, most rabies cases occur in wild animals such as bats and skunks. In 2019, 3,461 animals were tested for rabies at the MDHHS Bureau of Laboratories (BOL). Fifty-eight animals tested positive, including 45 bats, 12 skunks and 1 cat. An additional bat was tested positive by the United States Dept of Agriculture/Wildlife Disease Rabies Program.

### In 2019...



**3,557**

animals were submitted for rabies testing



**12**

skunks tested positive for rabies



**1**

cat tested positive for rabies



**3.6%**

of bats tested were infected with rabies

## Rabies Post-Exposure Prophylaxis (RPEP) Reporting

In 2018, the MDHHS EZID Section initiated a pilot project to explore making Rabies Post-Exposure Prophylaxis (RPEP) a reportable condition. Over 80% of the local health jurisdictions participating in the pilot project supporting making RPEP a reportable condition, and RPEP was added to the [MDHHS Reportable Disease/Condition list](#) for 2019. Over 5,000 animal bites were entered into MDSS in 2019, and 1,000 RPEP courses were reported to public health.

### Benefits of RPEP Reporting

- Allows health departments to identify and address errors in RPEP administration
- Improves patient follow-up to ensure that the series is completed
- Creates opportunities to educate healthcare providers on responsible RPEP use
- Could help prevent unnecessary RPEP treatments

### 2019 Animal Rabies PEP Courses in MDSS

- 1000 RPEP courses initiated
- 48% RPEP courses recommended and completed
- 18% of RPEP courses with irregularities
  - Schedule issues
  - Not finished
  - RIG not given
- 12% lost to follow-up
- 10% started but not recommended
  - Animal known/QT/tested negative
  - Non-exposure/non-rabies vector

### RPEP Poster for

### Healthcare Providers

**Rabies Post-Exposure Prophylaxis (PEP)**

**Before You Administer Rabies PEP Ask/Know:**

**If The Victim Was Bitten/Exposed To A Wild Animal (Except Rodents)\***

What to Ask	Action to Take
Is the animal available for rabies testing?	<div>✗ If "Yes" WAIT to Initiate PEP until test results are available</div> <div>✓ If "No" Initiate PEP</div>

\*Small rodents are rarely infected with rabies (woodchucks are the exception).

**If The Victim Was Bitten By A Dog, Cat, or Ferret:**

What to Ask	Action to Take
Is the animal available for a 10-day observation period?	<div>✗ If "Yes" WAIT to Initiate PEP for animal to complete 10-day observation period</div> <div>! If "No" Please refer to the Michigan Rabies Assessment Flowchart</div>

**i Reporting and Questions About Unusual Circumstances**

Report any animal bites or exposures where rabies is suspected to your local health department

For questions about an animal exposure, please consult with your local health department at or call **517-335-8165**

<http://www.michigan.gov/rabies>

Hospital fees to initiate RPEP can exceed **\$10,000!**

Waiting a few days to begin treatment can prevent unnecessary patient discomfort and expense!

MDHHS

## WHAT CAN BE DONE?

### Everyone can....



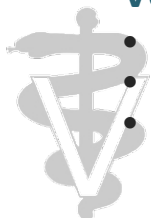
- **Vaccinate** your pets against rabies and keep them up to date
- **Avoid** contact with wild or unfamiliar animals
- **Know** what to do if you find a bat in your home (talk to your local health department before you let it go)
- **Keep** a list of important phone numbers that includes animal control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

### Health Care Providers can....



- Report animal bites to your local health department, and consult with state or local public health concerning cases that are uncertain
- Treat potential exposures using (ACIP) best practices
- Report Rabies Post-Exposure Prophylaxis administrations to your local health department.

### Veterinarians can....

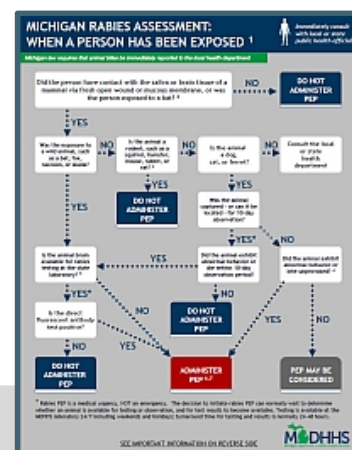


- Vaccinate pets and livestock against rabies
- Educate your clients and the public about rabies prevention
- Ensure your rabies titers remain at protective levels

### 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



## GUIDES AND PRINTED RESOURCES

MDHHS Rabies Flowcharts: [www.michigan.gov/rabies](http://www.michigan.gov/rabies)

MDHHS Poster: Rabies PEP Guidance for Healthcare Providers and Facilities: [www.michigan.gov/rabies](http://www.michigan.gov/rabies)

Communicable Disease Publication Order Form: [www.michigan.gov/cdinfo](http://www.michigan.gov/cdinfo)

# ANIMAL-ASSOCIATED DISEASES





## SWINE INFLUENZA

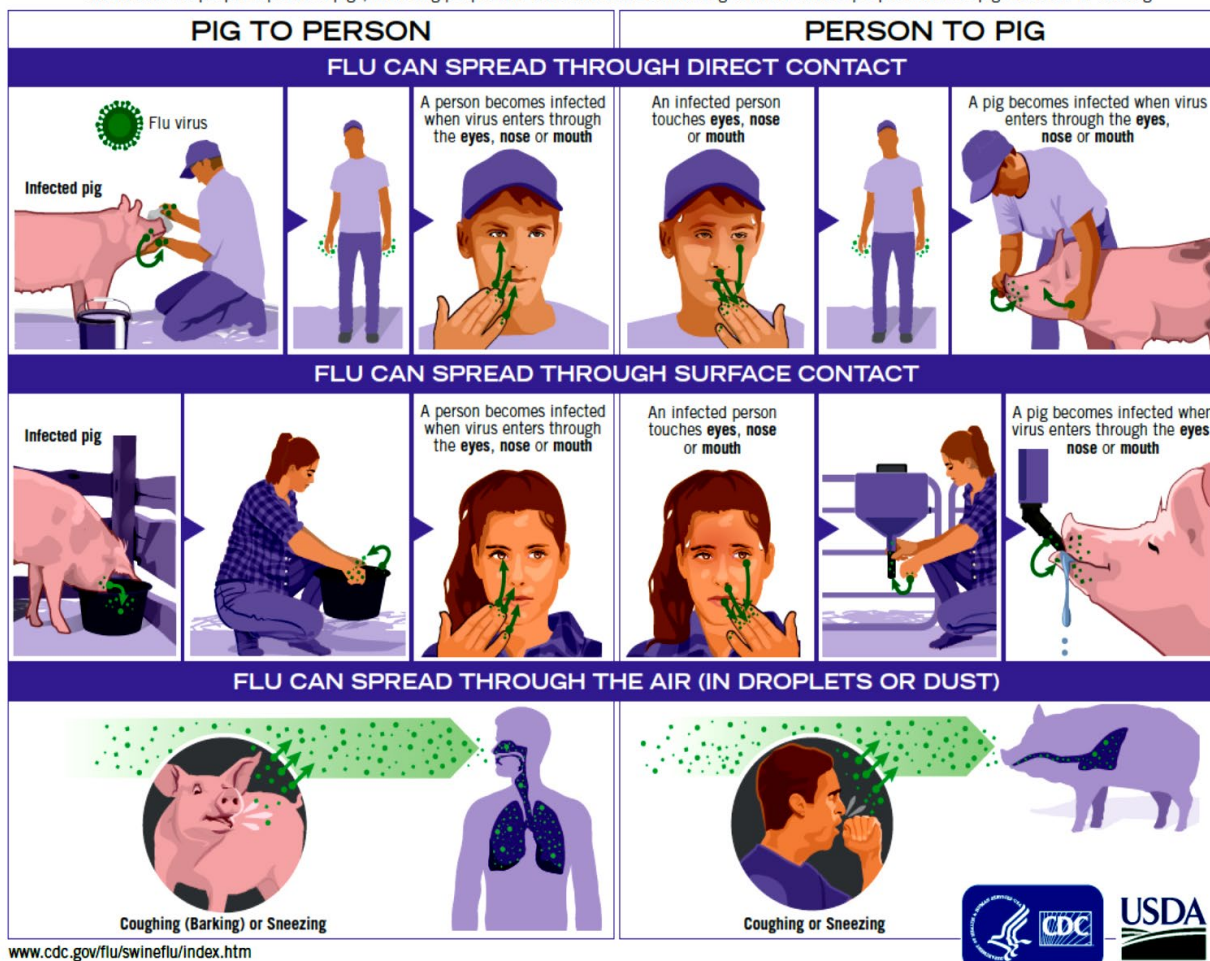
Swine influenza (swine flu) is a respiratory disease in pigs caused by type A influenza viruses that regularly circulate among swine. When these influenza viruses are transmitted to humans, they can cause illness and are referred to as a swine variant influenza viruses. Human infections are usually caused by exposure to infected live pigs, and not from eating or handling pork products. Although there are some documented cases of



person-to-person transmission of swine variant influenza, it is rare. Symptoms of swine flu in people are similar to seasonal flu and can include fever, cough, runny nose, and sometimes body aches, nausea, vomiting or diarrhea. On rare occasions, swine influenza in humans can be severe, leading to pneumonia or death.

### FLU CAN SPREAD BETWEEN PIGS AND PEOPLE

Information for people exposed to pigs, including people who enter the swine barns at agricultural fairs or people who raise pigs for show or farming



[www.cdc.gov/flu/swineflu/index.htm](http://www.cdc.gov/flu/swineflu/index.htm)



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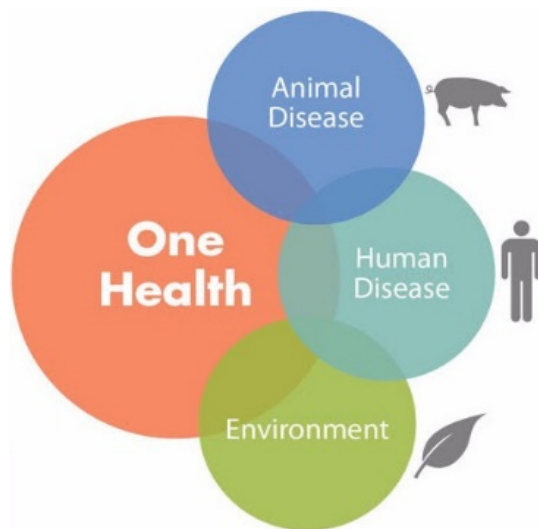
## 2019 Swine Variant Influenza Surveillance

In 2019, a swine influenza was detected in sick pigs at three agricultural fairs. These events took place in Livingston, Lapeer and Jackson counties in late July and early August. No human cases of influenza were confirmed in people with exposure to sick pigs at these events. The swine influenza variant detected at all events was Influenza A H1N2. One human case of swine variant influenza (H1N1v) was detected through routine influenza surveillance, in an individual with no known exposure to pigs.

### One Health in Action

Outbreaks of zoonotic disease such as swine flu require a One Health approach, with human and animal health experts working together.

- CDC
- MDHHS
- MDARD
- Local Health Departments
- MSU Veterinary Diagnostic Laboratory
- USDA



Since 2014, the MDHHS Emerging & Zoonotic Infectious Disease Section (EZID) has been partnering with the Centers for Disease Control and Prevention, the Council of State and Territorial Epidemiologists, and the Michigan State University Extension to educate youth involved in agricultural programs about Zoonotic Diseases, with an emphasis on Swine Influenza. Other states have also been funded and the resources developed from this project can be found at <https://resources.cste.org/via>.

### Swine Variant Influenza Toolkit

MDHHS has developed a swine flu toolkit to provide Michigan local health departments (LHDs) with guidance on detection of and response to a swine flu outbreak. This toolkit contains general information regarding swine flu, historical data on swine flu in Michigan, and how LHDs and fair boards can prepare for the fair season, including actions to take in the event of a swine flu positive pig or human ([www.michigan.gov/cdinfo](http://www.michigan.gov/cdinfo)).



## WHAT CAN BE DONE?

### Everyone can....

- ➔ People at high risk of serious flu complications (<5 years or >65 years, pregnant, immune-suppressed) should avoid pigs and swine barns at agricultural events
- ➔ Do not eat, drink, or put anything in your mouth in pig areas
- ➔ Do not take toys, pacifiers, cups, baby bottles, strollers, or similar items into pig areas
- ➔ Wash your hands with soap and water or alcohol-based hand sanitizer when soap and water are not available, before and after being around pigs or their environment
- ➔ Avoid close contact with animals that look or act ill

### Fair Exhibitors can....

- ➔ Watch pigs for illness (like loss of appetite, cough, or runny nose) and call a veterinarian if you suspect illness
- ➔ Avoid close contact with pigs that look or act ill and notify fair veterinarian and/or fair manager that your pig may be ill
- ➔ Don't eat or drink or put anything in your mouth in the pig barn and show area
- ➔ Wash your hands often with soap and running water before and after exposure to pigs (use an alcohol-based hand sanitizer if running water not available)
- ➔ If you must work around sick pigs, use appropriate personal protective equipment, such as gloves and a face mask or respirator

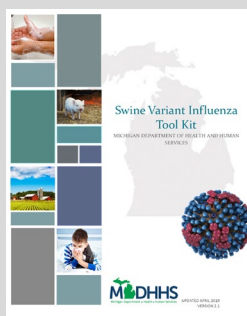
### Health Providers can....

- ➔ Review public health data regarding the risk of swine flu in Michigan
- ➔ Clinicians treating patients with an influenza-like illness (fever >100°F plus a cough and/or a sore throat) should ask about recent exposure to swine or attendance at agricultural fairs
- ➔ If swine flu is suspected, collect upper respiratory specimens as soon as possible and submit to MDHHS BOL
- ➔ Diagnose and treat infections using best practices
- ➔ Report cases promptly to your local health department
- ➔ Remind patients about the risk of zoonotic infection in your area and ways to prevent infections

### Public Health Agencies can....

- ➔ Make Michigan data publicly available
- ➔ Promote swine flu prevention
- ➔ Establish relationships and communication with local fairs and exhibitors
- ➔ Support a One Health multidisciplinary approach to achieve optimal health outcomes

## UPDATED GUIDES AND PRINTED RESOURCES



### Swine Variant Influenza Tool Kit:

[https://www.michigan.gov/documents/mdhhs/Swine\\_Variant\\_Influenza\\_Tool\\_Kit\\_654250\\_7.pdf](https://www.michigan.gov/documents/mdhhs/Swine_Variant_Influenza_Tool_Kit_654250_7.pdf)

### Preventative Tips for Fairs & Exhibitions:

[https://www.canr.msu.edu/swine\\_influenza/preventative\\_tips\\_for\\_fairs\\_exhibitions](https://www.canr.msu.edu/swine_influenza/preventative_tips_for_fairs_exhibitions)

### Exhibitor and Parent Fact Sheet: Swine Influenza:

[https://www.canr.msu.edu/resources/exhibitor\\_and\\_parent\\_fact\\_sheet\\_swine\\_influenza](https://www.canr.msu.edu/resources/exhibitor_and_parent_fact_sheet_swine_influenza)

### CDC Influenza and Zoonoses Education among Youth in Agriculture:

<https://www.cdc.gov/onehealth/in-action/influenza-and-zoonoses-education.html>

# SALMONELLA

## Salmonellosis Associated with Backyard Poultry

Salmonellosis is an infection caused by bacteria called *Salmonella*. *Salmonella* causes approximately 1.2 million human illnesses, 23,000 hospitalizations, and 450 deaths in the United States every year. Furthermore, reported *Salmonella* cases underestimate the total number of cases. For every case of diagnosed *Salmonella*, there are potentially 30 more cases that are not reported or diagnosed. Contact with live poultry has become an increasing public health concern as backyard flock ownership has grown in popularity. In fact, there have been 76 *Salmonella* outbreaks in the United States linked to backyard poultry since 2000.

Most people infected with *Salmonella* develop diarrhea, fever, and abdominal cramps 12 to 72 hours after infection. The illness usually lasts 4 to 7 days, and most people recover without treatment, but in some cases the infection may cause severe diarrhea or other complications requiring hospitalization.



*Salmonella* is typically spread by the fecal-oral route. Most *Salmonella* cases are caused by ingestion of contaminated food and water; however, direct animal contact is estimated to account for 11% of *Salmonella* transmissions.

### Tips to stay healthy with your backyard flock:



- Always wash hands thoroughly with soap and water right after touching live poultry or anything in their environment.
- Don't let children younger than 5 years handle or touch live poultry without adult supervision.
- Set aside a pair of shoes to wear while taking care of your birds and keep those outside of your home.
- Do not let live poultry inside the house, in bathrooms, or especially in areas where food or drink is prepared, served, or stored, such as kitchens or outdoor patios.



For a complete list of recommendations, visit the CDC Healthy Pets, Healthy People website section on backyard poultry.  
<https://www.cdc.gov/healthypets/pets/farm-animals/backyard-poultry.html#tabs-2-3>





## Outbreak of *Salmonella* Infections Linked to Pet Hedgehogs

- In 2019, a total of 54 people were infected with the outbreak strain of *Salmonella* Typhimurium from 23 states, including 8 from Michigan
  - 8 people were hospitalized, none died
- 84% of ill people interviewed reported contact with a hedgehog
- The outbreak strain was found in samples from hedgehogs from Minnesota and Oregon and hedgehog habitats in Michigan
- No common supplier was identified

Accessible version: <https://www.cdc.gov/healthypets/publications/stay-healthy-around-small-pets.html>

### Stay healthy around small pets!



Pet rodents (such as mice, rats, hamsters, gerbils, and guinea pigs) and other small pets (such as hedgehogs, sugar gliders, chinchillas, and ferrets) can sometimes carry germs that can make people sick. These germs can cause illnesses ranging from serious diarrhea to birth defects.

- Small pets can carry germs even if they look healthy and clean.
  - Germs are shed in their droppings and can easily contaminate their bodies, habitats, toys, bedding, and anything in areas where they live.
  - These germs can spread to people after they touch these animals or anything in their habitats.
- But there's good news! You can take steps to stay healthy while enjoying your pets.**

### PROTECT YOURSELF AND YOUR FAMILY FROM GERMS



#### PICK THE RIGHT PET FOR YOUR FAMILY.

Rodents and other small pets are not recommended for children under 5 years old, adults over 65, or people with weakened immune systems because they are at a greater risk for serious illness from germs that pets can carry.

#### WASH YOUR HANDS.

- Always wash hands thoroughly with soap and water right after touching, feeding, or caring for your pets or cleaning their habitats.
- Adults should supervise hand washing for young children.
- If soap and water are not readily available, use hand sanitizer until you are able to wash your hands thoroughly with soap and water.



#### KEEP IT CLEAN.



- Keep small pets and their supplies out of kitchens and other areas where food is prepared, served, stored, or consumed.
- Clean habitats, toys, and supplies outside the house when possible.
- If you clean supplies indoors, use a laundry sink or bathtub, and thoroughly clean and disinfect the area right after.

#### PLAY SAFELY.

- Don't kiss, snuggle, or hold small pets close to your face.
- Don't let them roam free in your home.
- Don't touch your mouth after handling small pets.
- Don't eat or drink around animals.

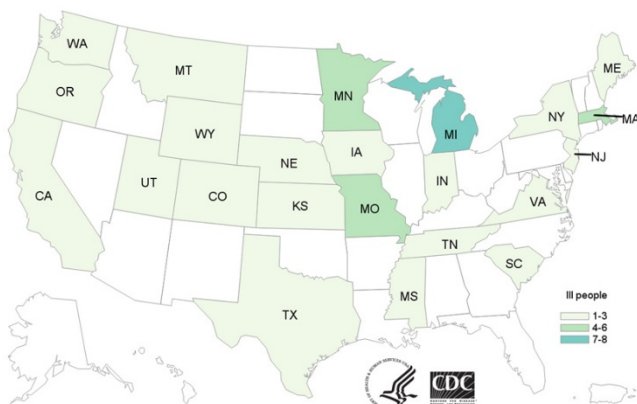


FOR MORE INFORMATION VISIT:  
[WWW.CDC.GOV/HEALTHYPETS](http://WWW.CDC.GOV/HEALTHYPETS)



Centers for Disease  
Control and Prevention  
National Center for Emerging and  
Zoonotic Infectious Diseases

CS294770-A



For information about current US  
Outbreaks of Zoonotic Diseases Spread between  
Animals and People, go to  
<https://www.cdc.gov/healthypets/outbreaks.html>

## WHAT CAN BE DONE?

### Everyone can....

- ➔ Wash your hands after touching pets and other animals, or their food, water, poop, belongings (such as toys and bowls), or habitats (such as beds, cages, tanks, coops, stalls, and barns)
- ➔ Don't put your hands in your mouth after petting or playing with animals
- ➔ Don't kiss cats, dogs, chickens, turtles, lizards, or other pets or animals
- ➔ Don't let children younger than age 5, people with weakened immune systems, or older adults touch high-risk animals (like turtles, frogs, chickens, or ducks) or their belongings or habitat
- ➔ Never eat or drink in areas where high-risk animals live and roam
- ➔ Clean your pet's bed, cage, terrarium, or aquarium and its contents (such as food and water bowls) outdoors or use a bathtub or large sink that can be cleaned and disinfected
- ➔ Take your pets to the veterinarian regularly

### Health Providers can....

- ➔ Report cases promptly to your local health department
- ➔ Submit specimens from *Salmonella* cases to MDHHS
- ➔ Remind patients about the risk of zoonotic infection from contact with household animals including backyard birds and ways to prevent infections

### Public Health Agencies can.....

- ➔ Make Michigan data publicly available
- ➔ Promote *Salmonella* infection prevention guidance
- ➔ Respond to *Salmonella* disease outbreaks
- ➔ Support a One Health interdisciplinary approach to achieve optimal health outcomes

## UPDATED GUIDES AND PRINTED RESOURCES

CDC Salmonella Website

<https://www.cdc.gov/salmonella/>

CDC Healthy Pets, Healthy People website section on backyard poultry

<https://www.cdc.gov/healthypets/pets/farm-animals/backyard-poultry.html#tabs-2-3>

USDA Defend the Flock Program

<https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/animal-disease-information/avian/defend-the-flock-program>

Stay Healthy Around Small Pets poster:

<https://www.cdc.gov/healthypets/resources/safety-around-small-pets-H.pdf>



# PSEUDOCOWPOX

## A COMMON DISEASE THAT IS UNCOMMONLY IDENTIFIED

In June 2019, a case of suspected cowpox in an agricultural worker was reported to the Huron County Health Department. Subsequent testing at the Centers for Disease Control and Prevention (CDC) was positive for pseudocowpox virus (also referred to as “milker’s nodules”), a zoonotic virus mainly reported in dairy cattle.

The patient lived and worked on a beef cattle farm. One week before illness onset, the patient had begun caring for a new shipment of calves, including bottle feeding, and did not wear gloves during these tasks. CDC subject matter experts noted that the large number of lesions present in this case was unusual and may have been related to cuts on the patient’s hands and arms.

Pseudocowpox is a parapox virus of cattle; it is reported mainly in dairy cattle. It is widespread in the U.S. but is rarely reported. Clinical presentation in humans is similar to other viruses, including the Parapox (orf, bovine papular stomatitis), Orthopox (monkeypox, cowpox, vaccinia, variola), and Herpes (varicella, herpes) virus families. A good history, including occupation, recent travel, animal contact, and vaccinations, and the number, distribution, and description of lesions can assist in a diagnosis.



*Photos of lesions at 16 days (left) and 21 days (right) post-onset.*



## WHAT CAN BE DONE?

### Everyone can....



- **Wear** gloves when handling or milking cattle, sheep, or goats, or touching contaminated equipment. This is especially important when you have an open cut or sore and are handling the animal’s mouth, muzzle, teats, or udder.
- **Wash** your hands and arms with clean, warm water and soap for at least 20 seconds after handling or milking cattle or touching contaminated equipment.
- **Keep** any skin lesion(s) dry and covered, and contact your health care provider if you experience pain, fever, or notice that the lesion is becoming rapidly larger or spreading.

### Health Care Providers, Veterinarians, and Public Health can....

- **Educate** yourself on symptoms and ask patients about potential cattle exposures.
- **Educate** patients who are at occupational risk for pseudocowpox and other pox diseases.
- **Report** any suspected pox or pseudopox illnesses to your local health department, and consult with state or local public health on cases that are uncertain.

Iowa State University fact sheet: [www.cfsph.iastate.edu/FastFacts/pdfs/pseudocowpox\\_F.pdf](http://www.cfsph.iastate.edu/FastFacts/pdfs/pseudocowpox_F.pdf)

Merck Veterinary Manual: [www.merckvetmanual.com/integumentary-system/pox-diseases/pseudocowpox](http://www.merckvetmanual.com/integumentary-system/pox-diseases/pseudocowpox)

# Michigan Emerging and Zoonotic Disease SURVEILLANCE SUMMARY 2019

Prepared by the Michigan Department of Health and Human Services  
Bureau of Infectious Disease Prevention  
Emerging & Zoonotic Infectious Disease Section (EZID)

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