Michigan Emerging and Zoonotic Disease

SURVEILLANCE SUMMARY

2018
# TABLE OF CONTENTS

## INTRODUCTION
Zoonotic Diseases in Michigan .................................................. 3

## ARBOVIRAL
West Nile and Eastern Equine Encephalitis ................................ 6
Mosquito Surveillance ................................................................. 7
Aedes albopictus in Michigan ..................................................... 8
Jamestown Canyon virus .......................................................... 9
What Can Be Done? ................................................................. 11

## TICKBORNE
Lyme Disease ........................................................................... 13
Statewide Tick Surveillance ....................................................... 15
Citizen-Submission Tick Program ............................................. 16
Other Tickborne Diseases .......................................................... 16
What Can Be Done? ................................................................. 17

## LIVESTOCK-ASSOCIATED DISEASES
Swine Influenza ....................................................................... 18
What Can Be Done? ................................................................. 21
Salmonella ............................................................................... 22
What Can Be Done? ................................................................. 24

## RABIES
2018 Rabies Data ...................................................................... 26
Rabies PEP Pilot ....................................................................... 27
What Can Be Done? ................................................................. 28
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) and quarterly One Health webinars.

This report provides a summary of epidemiologic information for select zoonotic and vector-borne diseases in Michigan for 2018 and updates on special projects.
# Zoonotic Diseases in Michigan – 5 Year Table

*Reported Cases in People*

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

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

*(Arthropod-Borne viruses)*
WEST NILE VIRUS & EASTERN EQUINE ENCEPHALITIS

In 2018, West Nile virus (WNV) sickened both Michigan residents (102) and visitors (2), resulting in many hospitalizations and nine fatalities, the most since 2012, when 202 cases and 17 deaths occurred. Routine testing of blood donations identified WNV in 12 asymptomatic Michigan blood donors. WNV infected two horses (Muskegon, Gratiot), and 1 alpaca (Isabella). Similar to 2017, the majority of WNV cases in Michigan occurred in the Metro Detroit and Grand Rapids areas during August to September. An Allegan county resident and two white-tailed deer from Cass and Barry counties were infected with Eastern Equine Encephalitis virus (EEE) in 2018.

2018 Arboviral Activity

A) Map of WNV and EEE Positive Human Cases: Number of confirmed and probable human WNV and EEE cases by county of residence
B) Map of WNV Positive Birds: Number of birds tested positive for WNV by county
C) Map of WNV Positive Mosquito Pools: Number of mosquito pools tested positive for WNV by county
D) Map of WNV and EEE Positive Mammals: Number of mammals tested positive for WNV and EEE by county
## MOSQUITO 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 mosquitoes, 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.

### MDHHS Annually Hosts Mosquito Training that Provides:
- Training on mosquito biology & identification
- Data management through MosquitoNet
- Mosquito traps & other supplies

![Mosquito Traps: CDC Light Trap (left) and Gravid Trap (right)](image)

### Mosquitoes Tested for Arboviruses in 2017 and 2018

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Eastern Equine Encephalitis</td>
<td>12,998</td>
<td>15,028</td>
<td>394</td>
<td>396</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>LaCrosse Encephalitis</td>
<td>587</td>
<td>505</td>
<td>287</td>
<td>264</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>St. Louis Encephalitis</td>
<td>18,704</td>
<td>7,883</td>
<td>1,599</td>
<td>1,034</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>West Nile Virus</td>
<td>39,059</td>
<td>33,535</td>
<td>2,828</td>
<td>2,447</td>
<td>183</td>
<td>159</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>71,348</strong></td>
<td><strong>56,951</strong></td>
<td><strong>5,108</strong></td>
<td><strong>4,142</strong></td>
<td><strong>183</strong></td>
<td><strong>159</strong></td>
</tr>
</tbody>
</table>

*159 Mosquito Pools* tested positive for WNV in 2018

*a mosquito pool consists of <50 mosquitoes collected from the same day, location, and species*
In 2018, for the second consecutive year, *Ae. albopictus*, the Asian tiger mosquito (a potential Zika virus vector) was identified in Wayne county through surveillance efforts coordinated by MDHHS, Wayne County Health Department, Michigan State University, the city of Livonia, and the Michigan Department of Environmental Quality (MDEQ). Similar to 2017, these mosquitoes were found in an industrial area, and were likely introduced by traveling within commercial goods sent from another state where the species is endemic.

Coordinated mosquito control efforts were initiated, including larvicides and adulticide spraying. However, the number of *Ae. albopictus* mosquitoes increased temporarily before they were no longer detected in late October. This invasive species is difficult to control due to its breeding locations in small, cryptic containers. The proximity of forested areas near the industrial site also likely provided harborage for additional mosquitoes.
JAMESTOWN CANYON VIRUS

Jamestown Canyon virus (JCV) is an arbovirus of the bunyavirus family closely related to La Crosse encephalitis virus. It is spread by mosquitoes and causes an acute febrile illness, meningitis, or meningoencephalitis. JCV has been isolated from various mosquito species including *Aedes, Coquillettidia, Culex*, and *Culiseta* species.

Mild JCV illness produces flu-like symptoms including a fever; however, in rare, more severe cases, swelling of the brain and surrounding areas, changes in mental status, seizures, or death can occur. The best method of prevention is to avoid mosquito bites by using an EPA-registered repellent on skin, wearing long-sleeved shirts and pants when outdoors, using permethrin on clothing, and draining standing water outside your home where mosquitoes can breed.

**JCV Prevention**

- Use an EPA-registered repellent on skin
- Wear long-sleeved shirts and pants treated with permethrin
- Drain standing water outside your home where mosquitoes can breed

**JCV Symptoms**

- Fever
- Fatigue
- Headache
- Weakness
- Brain Swelling
- Confusion
Recent Jamestown Canyon Virus Activity

Human JCV infections are generally rare in the United States. In 2017, 75 human cases of JCV were reported nationally, which was more than what has been reported in previous years. These cases occurred in eight states, primarily in the Northeast and the upper Midwest. In 2018, the first ever human JCV cases were reported in Michigan (one in Oakland county and one in Menominee county). Nationally, there were 41 human cases reported from eight states (see map).

National Jamestown Canyon Virus Activity in 2018

*JCV Veterinary cases or infections in mosquitoes, birds, or sentinel animals
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 mosquitoes 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:

MDHHS West Nile Virus Website:
www.michigan.gov/westnile

MDHHS MI Disease Mapper
www.michigan.gov/MIDiseaseMapper

Centers for Disease Control and Prevention Arbovirus Websites:
www.cdc.gov/westnile
www.cdc.gov/jamestown-canyon
www.cdc.gov/EasternEquineEncephalitis
Michigan Emerging and Zoonotic Disease
SURVEILLANCE SUMMARY 2018

TICK-BORNE DISEASES
LYME DISEASE

Lyme disease (LD) is the most commonly reported vector-borne disease in the United States; over 29,000 confirmed cases were reported nationally in 2017. 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 262 total cases in 2018, 159 were locally acquired, 35 were travel related, and 68 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 along the coast of the western Lower Peninsula. In addition, the distribution of the blacklegged tick is expanding into new areas across the state.

In 2018, 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).

In 2018, 262 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, 2013-2018

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

- Dickinson 100
- Menominee 71
- Ontonagon 46
- Keweenaw 38
- Gogebic 22

Map of the average number of human Lyme disease cases per 100,000 persons in each county from 2014 to 2018
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.
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 conducted surveillance throughout the state in 2018.

In 2018...

>220 km² sampled

For the presence of blacklegged ticks (*Ixodes scapularis*) across 68 field sites

959 blacklegged ticks collected from April through November

506 Ticks Tested for disease-causing organisms at the CDC Vector-Borne Disease Laboratory in Ft. Collins, CO

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

2018 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. In 2018, 857 ticks were submitted via mail to MDHHS for identification and testing, and an additional 152 tick photos were submitted via email.

<table>
<thead>
<tr>
<th>Tick Species</th>
<th>Number of Tick Photos Submitted</th>
<th>Number of Ticks Submitted</th>
<th>Identified in 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Dog Tick</td>
<td>120</td>
<td>547</td>
<td>667</td>
</tr>
<tr>
<td>(Dermacentor variabilis)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blacklegged Tick</td>
<td>29</td>
<td>296</td>
<td>325</td>
</tr>
<tr>
<td>(Ixodes scapularis)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lonestar Tick</td>
<td>3</td>
<td>14</td>
<td>17</td>
</tr>
<tr>
<td>(Amblyomma americanum)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>152</td>
<td>857</td>
<td>1,010</td>
</tr>
</tbody>
</table>

*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
Michigan Emerging and Zoonotic Disease
SURVEILLANCE SUMMARY 2018

ANIMAL-ASSOCIATED DISEASES in HUMANS
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 diagram]
Three human cases of swine variant influenza occurred in Michigan in 2018, due to infected pigs at an agricultural fair in Livingston County. Livingston County Health Department (LCHD), MDHHS, and the Michigan Department of Agriculture and Rural Development (MDARD) worked together to quickly investigate and control the outbreak.

Investigation:

- July 2018: LCHD notified of pigs at the fair exhibiting flu-like symptoms
- Pig barn closed to prevent further human exposure
- LCHD, the fair board, MDHHS, and MDARD coordinated a response
- Samples were collected from the pigs and sent to Michigan State University Veterinary Diagnostic Laboratory
  - 14 pig samples tested positive for swine influenza A H1N2
- Investigations by MDHHS and LCHD yielded:
  - 18 people who experienced respiratory illness after attending the fair
  - 17 ill individuals submitted respiratory specimens to the MDHHS Bureau of Laboratories for testing
  - 3 samples were positive for influenza A H1N2v
  - Viruses found in humans and pigs were identical

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

Swine Variant Influenza Toolkit

In 2018, MDHHS 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).
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

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
CDC Influenza and Zoonoses Education among Youth in Agriculture: https://www.cdc.gov/onehealth/in-action/influenza-and-zoonoses-education.html
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.

**Salmonellosis Associated with Backyard Poultry**

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
Individuals diagnosed with salmonellosis are interviewed by local and/or state public health officials and asked about symptoms and possible sources of exposure. *Salmonella* laboratory specimens are submitted to state public health labs for genetic testing. If an outbreak is identified, environmental sampling and traceback then take place.

Most consumers purchase live birds for backyard flocks from local agricultural feed stores. About two dozen hatcheries around the U.S. produce birds to supply agricultural feed stores. In *Salmonella* outbreak investigations that indicate contact with live poultry, environmental sampling of source hatcheries rarely occurs because of challenges associated with tracing the birds to their origins. Since 2016, MDHHS, in partnership with Michigan local health departments have been sampling live poultry shipping box liners to detected *Salmonella* and to track the boxes to their source hatchery through shipping label information. This can assist public health investigators in identifying strains of *Salmonella* linked to human infection and their potential hatchery of origin. As a result, hatcheries producing infected birds can be notified and investigated, with the goal of identifying management practice improvements to reduce the burden of *Salmonella* in their flocks.

**Salmonella Investigation Results Summary:**

2016-18 Michigan Feed Store Shipping Boxes (photo 1a):
- 136 samples collected
- 65% *Salmonella* positive samples originate from one poultry hatchery

2018 Michigan Hatchery Investigation (photo 1b):
- 45 samples collected
- 4 *Salmonella* positive samples
  - 1 *Salmonella* Enteritidis positive sample
    - Related to isolates from human cases and environmental isolates from birds supplied by hatchery
  - 3 *Salmonella* Typhimurium positive samples
    - Not related to positive samples from human cases
    - Likely associated with a poultry vaccine strain
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

Morbidity and Mortality Weekly Report (MMWR):
1. Notes from the Field: Environmental Investigation of a Multistate Salmonellosis Outbreak Linked to Live Backyard Poultry from a Mail-Order Hatchery — Michigan, 2018
   https://www.cdc.gov/mmwr/volumes/67/wr/mm675152a5.htm?s_cid=mm675152a5_w
2. Notes from the Field: Live Poultry Shipment Box Sampling at Feed Stores as an Indicator for Human Salmonella Infections – Michigan, 2016-2018
   https://www.cdc.gov/mmwr/volumes/68/wr/mm6817a6.htm?s_cid=mm6817a6_w

Poultry Science – Onsite Investigation at a Mail-Order Hatchery
Michigan Emerging and Zoonotic Disease

SURVEILLANCE SUMMARY 2018

RABIES
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 2018, 3,457 animals were tested for rabies at the MDHHS Bureau of Laboratories (BOL). Seventy-nine animals tested positive, including 77 bats and 2 skunks.

Between 2013-2018, 268 animals tested positive for rabies and about 94% of these animals were bats. (See map below).

### Rabies Positive Animals 2013-2018

<table>
<thead>
<tr>
<th>Positive animals by species</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Bat</td>
<td>253</td>
</tr>
<tr>
<td>Skunk</td>
<td>13</td>
</tr>
<tr>
<td>Fox</td>
<td>1</td>
</tr>
<tr>
<td>Cat</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>268</td>
</tr>
</tbody>
</table>

### Rabies positive animals

- 0
- 1-5
- 6-10
- 11-30

In 2018...

- 3,457 animals were submitted for rabies testing.
- 5.1% of bats submitted were infected with rabies.
- 2 skunks tested positive for rabies.
In 2018, the EZID Section initiated a Rabies Post-Exposure Prophylaxis (RPEP) Reporting Pilot by recruiting six local health departments (LHDs) to participate in a RPEP Working Group. For the pilot project, participating LHDs requested that healthcare facilities in their jurisdiction report all RPEP administrations to them.

Most RPEP treatments reported during the pilot were initiated following an exposure to a bat. Working Group participants learned that animal bites were not always reported to LHDs as required in the Public Health Code. The study also identified issues with both administration and follow-up of RPEP treatments, indicating a need for more health care provider education regarding RPEP protocols. Overall, participants found the Michigan Disease Surveillance System (MDSS) useful for case follow-up, but reporting gaps needed to be addressed. Based on these findings, it was determined that making RPEP reportable in Michigan would be beneficial and RPEP was added to the list of Reportable Conditions for Michigan in 2019.

**Post-Pilot Survey of Participating Local Health Departments**

83% of LHDs agreed that RPEP should be reportable in Michigan and that requiring healthcare facilities to report RPEP to the LHD was helpful and useful.

**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

**Animal Species Exposures for which PEP was Initiated During the Pilot**

- Bats: 79%
- Dogs: 7%
- Cats: 9%
- Other: 1%
- Unknown: 2%
- Raccoons: 2%
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
Communicable Disease Publication Order Form: www.michigan.gov/cdinfo
Michigan Emerging and Zoonotic Disease
SURVEILLANCE SUMMARY 2018

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

333 S Grand Ave, 3rd Floor, Lansing, MI 48933
(517) 335-8165

Published October 2019

Emerging & Zoonotic Infectious Disease Section (EZID)
Mary Grace Stobierski, DVM, MPH, DACVPM – Manager & State Public Health Veterinarian
Kimberly Signs, DVM – Zoonotic Disease Epidemiologist
Emily Dinh, PhD -- Medical Entomologist
Rachel Potter, DVM, MS – Vector-Borne Disease Epidemiologist
Rebecca Reik, MPH – Zoonotic Disease Epidemiologist
Stephanie McCracken, MPH – Vector-Borne Disease Coordinator
with contributions from
Kimberly Fake, MS – MCE Vector-Borne Disease Research Fellow

www.michigan.gov/emergingdiseases