

**SALMONELLA AND LIVE BABY
POULTRY**
CHICKS CAN MAKE YOU SICK

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SALMONELLA FACTS

- Approximately 42,000 confirmed cases of human illness due to *Salmonella* are reported annually in the U.S.
- CDC estimates actual cases may be 29 times that number (1.2 million)
- Approximately 400 people die each year from acute Salmonellosis
- Children are most likely to get infected
- Infants, the elderly and the immune suppressed are most likely to get severely ill
- Rare cases can develop "reactive arthritis" following a *Salmonella* infection which can last from months to years
- Salmonellosis has a seasonal pattern, more common in summer



SYMPTOMS OF SALMONELLOSIS

- Fever, diarrhea, abdominal cramps
- Incubation period is 12-72 hours
- Illness typically lasts 4-7 days
- Most people recover without treatment
- For some, diarrhea is severe enough to require hospitalization
- In severe cases, *Salmonella* can spread to the blood stream, requiring antibiotic treatment
- Fecal excretion of *Salmonella* usually persists for days to weeks after illness has resolved.



BACKYARD FLOCK: A POPULAR HOBBY

Backyard flock ownership is increasing

A four city survey found:

1% of households owned chickens

Most had owned chickens for <5 yrs

4% planned to become first-time chicken owners in the next 5 years

Not your grandma's chicken coop...



SYNCHRONICITY

- Poultry are traditionally produced as an agricultural commodity
- Backyard flock owners are often inexperienced in "animal husbandry"
- Baby poultry initially need to be kept in warm conditions-are mistakenly kept indoors and handled as other more traditional pet species
- Equipment may be cleaned in the kitchen or bathroom leading to cross-contamination
- Kissing and snuggling baby poultry has been commonly reported by case patients



Most people are not aware that healthy poultry can carry diseases that can make people sick

SALMONELLA OUTBREAKS LINKED TO LIVE POULTRY

- Infected birds can shed *Salmonella* (sometimes intermittently) and appear healthy
- From 1996-2012, 45 outbreaks have been linked to contact with live poultry including >1581 illnesses, 221 hospitalizations, 5 deaths
- Median size of outbreaks was 24 illnesses (range 12-195)
- Multiple salmonella serotypes have been involved in outbreaks
- Specific strains have been linked to mail-order hatcheries over multiple years
- Historically, these outbreaks occurred in the spring when chicks were a popular pet for children during the Easter season.
- At present, outbreaks linked to poultry in backyard flocks occur year-round, the first of these was recognized in 2007.



2012 WAS A BANNER YEAR FOR POULTRY-ASSOCIATED SALMONELLA ILLNESS IN PEOPLE

- There were a record EIGHT outbreaks (multiple serotypes) linked to contact with live baby poultry, with more than 450 ill, many of them children
- 73% reported contact with baby poultry
- 33% kept birds inside the home
- Time from purchase to illness ranged from 3-106 days (average 17 days)

Since the 1990s,
45 *Salmonella* outbreaks have been linked to live poultry.

LIVE POULTRY INDUSTRY

~20 hatcheries in the U.S.

- 50 million birds sold annually
- \$50-\$70 million in sales

Only two serotypes of *Salmonella* are of economic concern to the poultry industry (*Pullorum* and *Typhoid*) because they cause illness and death in birds

- The NPIP (National Poultry Improvement Plan) is a voluntary program with the goal to control *Salmonella* that makes birds sick, **does not address *Salmonella* that makes people sick**

TRACE BACK TROUBLE

- Outbreaks associated with live poultry are notoriously difficult to solve
- Longstanding industry practice of DROP SHIPPING hinders trace back efforts
- DROP SHIPPING is the practice where Hatchery A has an order for a breed of bird they are out of and so they ask Hatchery B to fill the order but send it out with Hatchery A's address on it.
- Trans-shipment is another high risk practice that can introduce *Salmonella* from an outside source into a hatchery

A SUCCESS STORY

- Beginning in 2005, an outbreak of *S. montevideo* was identified
- Over the next 7 years, 316 cases that matched the outbreak pattern were identified, 77% reported contact with live poultry
- All were eventually linked to a single hatchery
- This hatchery worked with NPIP and CDC to utilize autogenous vaccines and made other improvements and changes to monitoring for *Salmonella*
- As a result, only one case was detected in 2012.
- This example provides evidence that changes to hatchery practices can prevent ongoing outbreaks associated with a particular serotype
- **However, *Salmonella* will always be a risk associated with contact with live poultry so....**

ADDITIONAL PREVENTION STRATEGIES

- CDC and other public health agencies have engaged in outreach to the Hatchery Industry in an effort to educate them about the human risk for *Salmonella* associated with contact with live poultry.
- Joint poster was developed for use at the wholesale and retail level.
- Some hatcheries now provide information about *Salmonella* on their websites and literature, as well as provide posters with each shipment of chicks.



ROLE OF AGRICULTURAL FEED STORES

Can play a key role in prevention and control of salmonellosis

Many offer traditional "CHICK DAYS" when live baby poultry are seasonally available for purchase

Survey of feed store staff in New Mexico and Pennsylvania found that most were aware of the risk for *Salmonella* from contact with live poultry (76% and 85%), few provide customer education about the risk (28% and 56%)

Store practices can propagate the spread of *Salmonella* through:

- Improper cleaning and disinfection of displays
- Mixing of birds from different sources
- Lack of hand washing/hand sanitizer for customers
- Lack of educational materials for customers



PUBLIC HEALTH EFFORTS - 2014

CDC Features:
<http://www.cdc.gov/Features/SalmonellaBabyBirds/>

CDC Media Kit:
<http://www.cdc.gov/media/dpk/2013/dpk-live-poultry-salmonella.html>

MDCH Mailing to Feed and Agricultural Stores including a laminated 11x17 CDC/USDA chick poster



RETAIL EFFORTS

Large Agricultural Store chain has worked with CDC to reduce human illnesses by:

- Improving customer safety through changes to displays and providing access to hand sanitizer
- Providing educational information about *Salmonella* through signage posted around the live poultry display, and at the point of sale
- Providing information and links to CDC *Salmonella* information on their website



INDUSTRY EFFORTS

- Proposed new voluntary *Salmonella* Monitoring Program for Industry
- One large retail chain is asking their live poultry suppliers to participate in this voluntary program
- CDC/NPIP recently conducted a joint survey of hatcheries in an effort to better understand the business and identify practice improvement areas



WHAT CAN LOCAL HEALTH DEPARTMENTS DO?

□ Outreach to local feed and pet stores that sell live poultry

- ✓ Provide educational materials to customers
 - Posters, hand washing signage, handouts at point of sale
- ✓ Discourage customer contact with live birds, particularly children <5yrs of age
- ✓ Provide hand sanitizer/ hand washing for customers that handle birds



SALMONELLA CASE INVESTIGATION

Animal Exposure?

- Ask about any exposure to animals in the recent past. These can include brief encounters in a school or retail setting, as well as caring for animals other than their own. It is important to obtain information about when and where those encounters occurred.
- Types of animals?
- Exposure to pets and/or their food? (This can range from dog or cat food to frozen mice.)
- If they have recently purchased a new pet or live poultry, it is important to obtain information about the vendor, breed of animal and date of purchase.



TICK-BORNE DISEASE SEASON

A MICHIGAN PRIMER FOR 2014

Erik Foster
Medical Entomologist
Michigan Department of Community Health



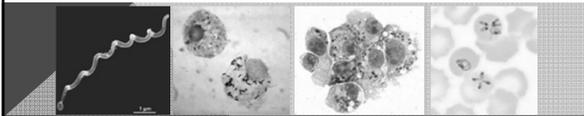
DEFINITION



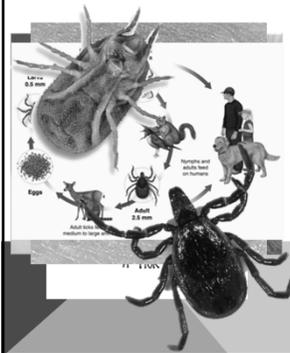
Tick-borne diseases are caused by infection with a variety of pathogens, including rickettsia and other types of bacteria, viruses, and protozoa transmitted by ticks.

LEADING TICK-BORNE DISEASES IN THE U.S.

- Lyme disease (*Borrelia burgdorferi*)
- Rocky Mountain spotted fever (*Rickettsia rickettsii*)
- Ehrlichiosis (*Ehrlichia chaffeensis*, others)
- Anaplasmosis (*Anaplasma phagocytophilum*)
- Babesiosis (*Babesia microti*)



WHAT IS A TICK?



- Ticks are more closely related to spiders and mites than insects
- They must feed on blood to complete their life cycle
- Ticks feed on a variety of animals from small and medium sized mammals, to birds and lizards
- It is generally within the enzootic, or tick/animal cycle that tick-borne diseases are maintained
- There are two major families of ticks
 - Argasidae - Soft ticks
 - Ixodidae - Hard ticks

HOW DO TICKS FIND THEIR PREY?

- ❑ The ticks that concern us in human health in the U.S. find their prey by "questing"
- ❑ Ticks climb onto vegetation to await a passing animal often along animal and man-made trails
- ❑ They may also crawl short distances in response to CO2
- ❑ Ticks DO NOT jump, fly, or drop onto people from trees



POLAR VORTICKS!

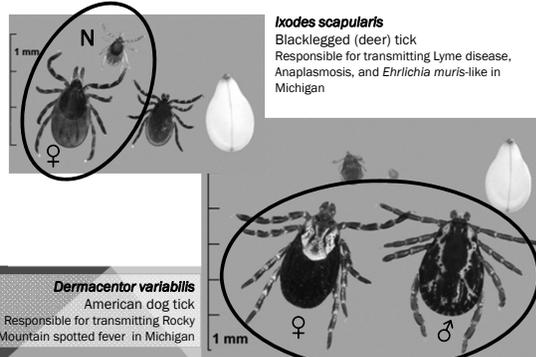
THE BIG QUESTION IN 2014:

WILL THE HARSH WINTER KILL THE TICKS???

- ❑ TICKS GENERALLY OVERWINTER AT THE SOIL INTERFACE, UNDER THE LEAF OR DUFF LAYER
- ❑ TICKS MAY BE INSULATED FROM HARSH WIND CHILLS BY SNOW
- ❑ TICKS CAN PREVENT FREEZING IN THEIR CELLS

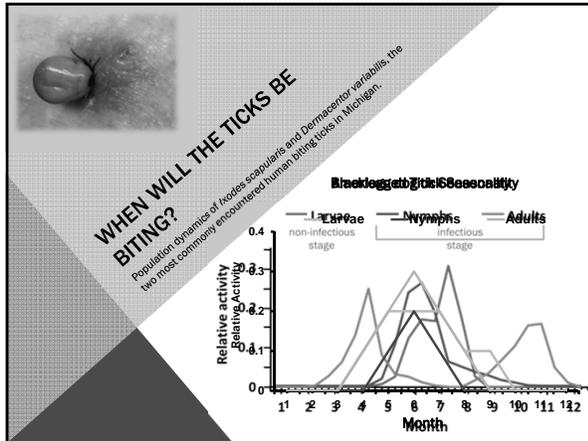


MOST COMMON TICKS SUBMITTED IN MI



Ixodes scapularis
Blacklegged (deer) tick
Responsible for transmitting Lyme disease, Anaplasmosis, and *Ehrlichia muris*-like in Michigan

Dermacentor variabilis
American dog tick
Responsible for transmitting Rocky Mountain spotted fever in Michigan



WHAT TO DO IF BITTEN BY A TICK

- Clean the area around the bite
- Promptly** remove the tick with fine-tipped tweezers or other tool
 - Removing *I. scapularis* prior to 36 hours of attachment will interrupt Lyme disease transmission
 - Do not worry too much if the head breaks off, keep the area clean
- Do not use a match!
- Some say that applying soapy water with a cotton ball will cause the tick to back out of the skin
- Clean the bite area again
- Pay close attention for signs or symptoms of tick-borne disease for up to two weeks

CONSIDER SUBMITTING THE TICK FOR ID OR TESTING

Public tick submissions are encouraged:

- Blacklegged ticks submitted alive, from human patients, will be forwarded to MDCH laboratory for Lyme disease testing
- Ticks from animals, or ticks that are dead may be tested for a panel of tick-borne diseases at the MSU Diagnostic Center for Population and Animal Health for \$55.

Test kits can be ordered from MDCH using the form "Communicable Disease Publications Order Form," available at www.michigan.gov/cdinfo

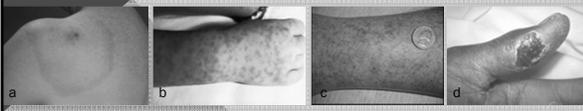
SIGNS AND SYMPTOMS OF TICK-BORNE DISEASE

General

- Fever
- Headache
- Malaise
- Lymphadenopathy

Rash

- a) Erythema migrans (70 to 80% of Lyme disease)
- b) Maculopapular (RMSF/anaplasmosis/ehrlichiosis)
- c) Petechial (20 to 30% of RMSF, late finding)
- d) Ulcer (tularemia)

A NOTE ON THE ERYTHEMA MIGRANS (EM) RASH

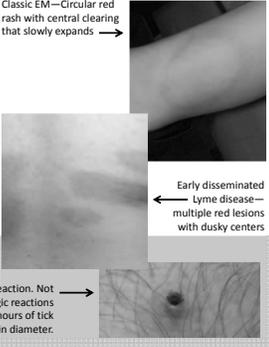
EM is defined as a skin lesion that typically begins as a red macule or papule and expands over a period of days to weeks to form a large round lesion, often with partial central clearing. The rash is not painful or pruritic, but it may be warm to the touch.

- A single primary lesion must reach greater than or equal to 5 cm in size across its largest diameter.
- Secondary lesions also may occur.
- Annular erythematous lesions occurring within several hours of a tick bite represent hypersensitivity reactions and do not qualify as EM.

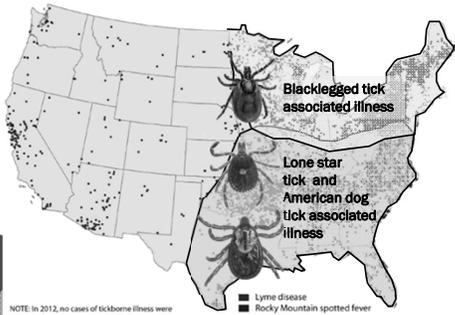
Classic EM—Circular red rash with central clearing that slowly expands →

Early disseminated Lyme disease—multiple red lesions with dusky centers ←

Tick bite with mild allergic reaction. Not an erythema migrans. Allergic reactions typically appear within the first 48 hours of tick attachment and are usually <5 cm in diameter. →



EMERGING TICK-BORNE DISEASES IN THE U.S.



Blacklegged tick associated illness

- Lyme disease
- Rocky Mountain spotted fever
- Anaplasmosis
- Ehrlichiosis

Lone star tick and American dog tick associated illness

NOTE: In 2012, no cases of tickborne illness were reported from Hawaii. In 2012, Alaska reported ten travel-related cases of Lyme disease.

NATIONAL TICK-BORNE DISEASE

Disease	2008	2009	2010	2011	2012
Lyme disease <small>(7th most commonly reported disease in the U.S.)</small>	35198	38468	30158	33097	30831
Spotted fever rickettsiosis	2563	1815	1985	2802	4470
Anaplasmosis	1009	1161	1761	2575	2389
Ehrlichiosis	957	944	740	850	1128
Powassan/Deer tick virus	2	6	8	12	7
Babesiosis	NR	NR	NR	1128	940

TICK-BORNE DISEASE EMERGENCE & RE-EMERGENCE



Michigan circa 1890's
© Detroit Publishing Company

- Reforestation
- Overabundant deer
- Increased numbers of ticks
- Expansion of suburbia into wooded areas
- Increased exposure opportunities
- Changes in diagnostic, surveillance, and reporting practices



MICHIGAN TICK-BORNE DISEASE

Disease	2009	2010	2011	2012	2013
Lyme disease	103	95	106	98	165
Anaplasmosis ¹	0	4	4	6	4
Babesiosis ²	0	0	0	2	2
<i>Ehrlichia muris</i> -like (EML) ³	0	0	0	0	1
Deer tick virus	0	0	0	0	0

¹ Anaplasmosis first reported in MI in 2009.
² Babesiosis first reported in MI in 2008; no autochthonous cases of Babesia have been reported in Michigan as of 2013.
³ Ehrlichia muris like first reported in MI in 2013.

LYME DISEASE HAS SPREAD WITHIN MICHIGAN

Lyme disease expansion: 1988 - 2013

- First detected in Menominee Co. in 1988
- MDCH conducted active physician surveillance and ecologic investigations through the 1990's
- Not detected in the Lower Peninsula until 2002
- Populations of infected ticks have expanded to encompass the western Lower Peninsula counties
- There are continuing efforts to identify expanding or newly establishing populations of infected ticks

CURRENT PROJECTS

Participating in a National Park Service/CSTE travel history pilot project:

- Assess the use of enhanced data gathering tools for assessing geographic exposure to various tick-borne diseases including Lyme disease

Michigan surveys for Lyme disease infected ticks:

- Broad survey of Michigan to determine if blacklegged tick populations have emerged in new areas, or have expanded from existing foci

Physician education project:

- Recorded presentation highlighting Lyme epi, ss/sxs, diagnostic testing, and treatment. Promotes disease reporting.

EPIDEMIOLOGY OF LYME DISEASE IN MI: 2013

EPI SNAPSHOT 2013

Cases (N=105)

- 130 reported in-state exposure
- 31 reported out-of-state exposure
- 4 unknown exposure

Age
Range: 3 - 88 years
Median: 44 years

Race/Ethnicity
>90% Caucasian, non-Hispanic

MI Lyme Disease Cases by month of onset, 2013

Month	Nymphs	Adults	Total
Jan	0	0	0
Feb	0	0	0
Mar	0	0	0
Apr	0	0	0
May	10	0	10
Jun	25	0	25
Jul	15	40	55
Aug	10	15	25
Sep	5	10	15
Oct	2	5	7
Nov	1	2	3
Dec	0	0	0

E.Foster, MDCH; April, 2014

TICK-BORNE DISEASE PREVENTION

Everyone can

- Inform themselves about where ticks can be encountered in Michigan
- Prevent tick bites by taking precautions and using EPA approved repellents on skin and clothing
- Shower soon after being outdoors
 - Washes away unseen nymphs and gets tick infested clothing off of the body
- Remove ticks promptly and safely if they have been bitten

Treat pets appropriately for ticks year-round

Seek prompt medical care fever or rash occurs after exposure to ticks



RESOURCES AVAILABLE

LOCAL

www.michigan.gov/lyme



NATIONAL

www.cdc.gov/lyme





Questions?
