The patient has WHAT?

Zoonotic Diseases: The Good, The Bad and The Ugly

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Toronto Public Health Issues Warning After Puppy Sold At Flea Market Dies From Rabies

BY NEWS STAFF
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More than 758 people have called so far. At least 60 people have been vaccinated.
Multistate Outbreaks of *Salmonella* Infections Linked to Contact with Live Poultry in Backyard Flocks, 2018

- *Salmonella* Infections Linked to Contact with Live Poultry in Backyard Flocks en Español
- Case Count Maps

Posted June 8, 2018 9:30 AM ET

**Outbreak Advisory**

- **124 Cases**
- **36 States**
- **21 Hospitalizations**
- **0 Death**

- CDC and multiple states are investigating several multistate outbreaks of *Salmonella* infections linked to contact with live poultry in backyard flocks.
- As of June 1, 2018, 124 people infected with the outbreak strains of *Salmonella* have been reported from 36 states.
  - Illnesses started on dates ranging from February 2, 2018 to May 14, 2018.
  - 21 ill people have been hospitalized, and no deaths have been reported.
  - 31% of ill people are children younger than 5 years.
- Epidemiologic, traceback, and laboratory findings link these outbreaks to contact with live poultry, such as chicks and ducklings, which come from multiple hatcheries.
  - In interviews, 55 (74%) of 74 ill people with information available reported contact with chicks or ducklings in the week before their illness started.
  - People reported obtaining chicks and ducklings from several sources, including feed supply stores, websites, hatcheries, and from relatives.
- Seventy outbreaks of *Salmonella* infections have been linked to contact with backyard flocks *since 2000* 📄 [PDF - 857KB]. In 2017, CDC reported the largest number of illnesses ever recorded linked to backyard flocks.
- People can get sick with *Salmonella* infections from touching live poultry or their environment. These birds can be carrying *Salmonella* bacteria but appear healthy and clean and show no signs of illness.

**Tips to Stay Healthy with a Backyard Flock**

- Always wash hands thoroughly with soap and water right after touching live poultry.
- Do not let children younger...
How do you like walrus? Well done is best amid outbreak in Alaska

2 outbreaks of trichinosis over last year in western Alaska

Dan Joling · The Associated Press · Posted: Jul 07, 2017 8:30 AM CT | Last Updated: July 7, 2017

Walrus during a hunt in Nunavut. Officials in the U.S. are warning people about the effects of undercooked game meat after two outbreaks of trichinosis over the last year in western Alaska. (Niore Iqalukjuak)

If walrus is in your dinner plans, the Centers for Disease Control and Prevention recommends you make sure it’s well done.

The federal health agency warned of the effects of undercooked game meat after two outbreaks of trichinosis over the last year in western Alaska. The outbreaks sickened 10 people and all have fully recovered.

It was the first multiple-case outbreaks of trichinosis associated with walrus, which can only be hunted by Alaska Natives for subsistence or handicraft purposes, since 1992.
Presentation Outline

- Zoonoses
  - Definition
  - Background
  - Transmission
  - Examples
  - Prevention

- Questions
Zoonotic Diseases

- **Zoonoses**
  - **Zoo** = Animal
  - **Noses** = Illness or Pathology

- **Definition:** Infectious agents or diseases that can be transmitted directly or indirectly from animals to humans

Animal ➔ Human
Zoonotic Diseases

- Approximately 60% of human pathogens are zoonotic (Taylor et al., 2001)
- Approximately 75% of emerging human pathogens are zoonotic (Taylor et al., 2001)
Types of Zoonotic Pathogens

- Bacteria
- Viruses
- Fungi
- Parasites
- Prions
## Some Emerging Zoonotic Diseases

<table>
<thead>
<tr>
<th>Date</th>
<th>Infection</th>
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<tbody>
<tr>
<td>1982</td>
<td><em>E. coli</em> O157:H7; <em>Borrelia burgdorferi</em></td>
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<td>1992</td>
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<td>1994</td>
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<td>1997</td>
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<tr>
<td>1998</td>
<td><em>Nipah virus</em>, <em>West Nile virus</em>, <em>Hong Kong influenza H9</em>N2</td>
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<td>2003</td>
<td><em>Monkey pox</em>; <em>SARS</em></td>
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<td>2009</td>
<td><em>Influenza H1N1</em></td>
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<tr>
<td>2012</td>
<td><em>MERS</em></td>
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</tbody>
</table>
Transmission of Zoonoses

- Direct contact with animals or animal excretions
  - Contact, aerosol, ingestion
Direct Contact

- Share our homes
- Visitation animals
- Petting zoos
- Occupational exposure
- At risk individuals/populations
Transmission of Zoonoses

- Direct contact with animals or animal excretions
  - Contact, aerosol, ingestion
- Indirect contact
  - Vector borne, fomites, food, water, environment
Foodborne, Waterborne, Environmental Transmission Routes
FUN ANIMAL FACT #1

Smudge as a kitten

Smudge all grown up

Smudge is deaf = 65-85% cats blue eyes + white fur
Congenital deafness = degeneration of inner ear
<table>
<thead>
<tr>
<th>Zoonotic Diseases: Dogs &amp; Cats</th>
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<tbody>
<tr>
<td>Rabies</td>
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<td><em>Salmonella</em></td>
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<tr>
<td><em>Campylobacter</em></td>
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<tr>
<td>Toxoplasmosis</td>
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<tr>
<td>Scabies</td>
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<tr>
<td>Cryptosporidium</td>
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<td>Roundworms</td>
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<td>Leptospirosis</td>
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<td>Ringworm</td>
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<tr>
<td>Tularemia</td>
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<tr>
<td><em>Pasteurella multocida</em></td>
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<tr>
<td>Cat scratch fever</td>
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</tbody>
</table>
Zoonotic Diseases: Farm Animals

Rabies, Anthrax, Brucellosis, TB (bovis), BSE, Leptospirosis, *E. coli* 0157, Listeriosis, Ringworm, *Strep suis*, Trichinellosis, Influenza, Menangle virus/Nepah virus, Erysipelas, Orf, Q-fever, Psittacosis, Western Equine Encephalitis, Eastern Equine Encephalitis, Venezuelan Equine Encephalitis, St. Louis Encephalitis, West Nile Virus, Hendra Virus, Salmonellosis, Glanders, MRSA, *Campylobacter jejuni*
Zoonotic Diseases: Wild Animals

- Rabies
- *Baylisascaris procyonis*
- Hantavirus
- Trichinosis
- Tularemia
- Plague
- Leptospirosis
- Salmonellosis
- Lyme Disease
Noteworthy Zoonotic Diseases: Saskatchewan

- Anthrax
- West Nile
- Cryptosporidium parvum (North Battleford)
- Northern Saskatchewan
  - Toxocara canis
  - Echinococcus
- Yersinia pestis (plague)
- Hantavirus
- Rabies
Pastoral Symphony - Beethoven
Bridge Over Troubled Water - Simon & Garfunkel
Everybody Hurts - REM
Case #1

(Van den Eden et al., Emerg Infect Dis, 2006;12:523-525)

- 31 year-old, healthy, female, Belgian
- Traveled with friends to Botswana, Namibia, and South Africa
- Early Jan/15, abrasion on finger, friend cleaned
- Blisters, black crust, edema of finger, hand, arm, enlarged lymph nodes, tendon in finger destroyed
- Anthrax suspected
- Legs dead antelope and sat on hippo carcass
Case #2

(Hajek et al., Can J Infect Dis Med Microbiol 2009; 20:177-180)

- Previous healthy 7 y.o. boy, autism, presents Toronto hospital with:

- Lethargy, anorexia, abd. pain, neuro signs (pulling arms into centre of body, exaggeration of reflexes, gazed right, coma)

- MRI: abnormalities cortex and cerebellum

- Eye exam: infiltrates in retina

- Child played in sandbox in yard, hands in mouth, raccoons in backyard

- Dx: Raccoon Roundworm Meningoencephalitis
August 1999, Alberta, increase in *Salmonella Infantis* cases in humans

- 8/12 *S. Infantis* cases dog owners
- 9/12 cases exposure pig ears
- 5/27 dogs owned by cases ill
- Molecular typing indicated same strain
- Handling pig ears?
- Shedding of organism in home from dogs?

*(Canada Communicable Disease Report 2000;26-06)*
Case #4

(The Guardian https://www.theguardian.com/lifeandstyle/2014/jan/31)

- June 2013, 59 y.o. man, Oregon, attempted to remove a mouse from mouth of stray cat who was choking.
  - Bitten by the cat during process, cat died and buried.
  - Day after: Sick, high fever. ER believed cat-scratch fever and gave antibiotics.
  - Few days later: ICU, life support, dialysis, collapsed lungs, heart stopped, coma 27 days, feet and hands swelling and turning black.

Plague
Case #5

(Srinivasan et al., NEJM 2005;352:1103-1111)

- Hospital in Texas, May 2004
- 4 recipients of kidneys, liver, arterial segment from common organ donor died of encephalitis of unknown cause
  - Inflammation of the brain – headache, fever, seizures, muscle weakness
- Organ donor and recipient diagnosis: Rabies
- Organ donor bitten by bat
FUN VET FACT #3

Giant Kidney Worm
Zoonotic Diseases Prevention

- Zoonoses exist in your locale (& those not zoonotic)
- Know routes of transmission
- At risk populations (young, old, immunocompromised)
- Animals: vaccination & deworming
- Humans: vaccination (especially travel)
- Safe food preparation
- Safe drinking water
- Insect repellent, appropriate clothing
- Wash hands
- COMMON SENSE
3 year old Great Dane repeatedly vomiting all day. In total: 43.5 socks removed from his stomach.
1. Adults females drop off host to lay eggs.
2. Eggs hatch into six-legged larvae.
3. Larvae attach to and feed on first host and may acquire B. burgdorferi.
4. Larvae molt into nymphs after leaving first host.
5. Nymphs attach to and feed on second host and may acquire B. burgdorferi.
6. Nymphs molt into adults after leaving second host.
7. Adults attach to the third host for feeding and mating.
8. Infected nymphs feed on humans, transmitting B. burgdorferi.
9. Infected adults feed on dogs, and sometimes humans, transmitting B. burgdorferi.