Multistate *Salmonella* Outbreak Linked to Guinea Pigs

Lauren Stevenson, MHS
Epidemiologist
Outbreak Detection

- Colorado Department of Public Health identified a cluster of *Salmonella Enteritidis* illnesses with reports of guinea pig exposure
- Colorado Department of Public Health then notified CDC
- CDC reached out to states via foodborne outbreak listserv and CDC PulseNet to identify other related illnesses
Salmonella in the Guinea Pigs: The Colorado Story

Nereida Corral, MPH
Cluster identification -

Salmonella Enteritidis cases pattern JEGX01.0021 in Colorado, 2017.

Unable to reach one case for onset date - collect date 11/7/17
WGS results for CO cluster:

*Salmonella enteritidis* 01-H

Tree

Pairwise hqSNP Matrix
Guinea Pig Testing and Traceback

January 2018 -

• Colorado Department of Agriculture visit to pet store for traceback records
• CDPHE staff collected and tested stool from one household.
  • Salmonella *not* isolated from stool sample collected in CO.
**Traceback**

**Family A**
- Purchased 2 GPs, 1 died, got a 3rd GP then returned the 2 surviving ones to the store within 7 days of purchase.
- 2 GPs 10/7/17
- 1 GP 11/4/17

**Family B**
- Purchased 2 GPs, 1 died, got a 3rd GP then returned the 2 surviving ones to the store within 7 days of purchase.
- 2 GPs 10/18/17

**Family C**
- Owns 4 total GPs, no ill family members, kids 11-19
- 1 GP 11/10/17

**Family D**
- 1 immunosuppressed adult, no illnesses, have 2 GPs
- 2 GPs 12/22/17

**Family E**
- No illnesses, still have both GPs, kids 3, 7, 9
- 1 GP 12/9/17

**Distributor A**
- Shipments: 9/5/17 (3), 9/19/17 (6)

**Pet Store A**
- 2 GPs 10/7/17
- 1 GP 11/4/17

**County Animal Shelter**
- 1 GP 11/6/17

**Pet Store C**
- GP housed alone
- 1 GP 11/10/17

**Pet Store B**
- 2 GPs 10/18/17

*Employees believe this family received 1 GP that had been returned by Family B*
Suspected Source: Detected
Multistate Outbreak Coordination

- State testing
- State traceback
- Multistate traceback
- Firm calls
- Public communication
Multistate Outbreak Summary

- Results from PulseNet and foodborne outbreak listserv queries
  - 9 illnesses from 8 states
    - 63% reported exposure to guinea pigs
  - Spanned multiple years
People infected with the outbreak strain of *Salmonella Enteritidis*, by date of illness onset
People infected with the outbreak strain of *Salmonella* Enteritidis, by state of residence
Multistate Outbreak of *Salmonella enterica*
Serotype Enteritidis Infection Associated with Pet Guinea Pigs

Michael L. Bartholomew, Richard T. Heffernan, Jennifer G. Wright, Rachel F. Klos, Timothy Monson, Sofiya Khan, Eija Trees, Ashley Sabol, Robert A. Williams, Raymond Flynn, Marshall P. Deasy, Benjamen Jones, and Jeffrey P. Davis

Abstract

*Salmonella* causes about one million illnesses annually in the United States. Although most infections result from foodborne exposures, animal contact is an important mode of transmission. We investigated a case of *Salmonella enterica* serotype Enteritidis (SE) sternum osteomyelitis in a previously healthy child who cared for two recently deceased guinea pigs (GPs). A case was defined as SE pulsed-field gel electrophoresis (PFGE) XbaI pattern JEGX01.0021, BlnI pattern JEGA26.0002 (outbreak strain) infection occurring during 2010 in a patient who reported GP exposure. To locate outbreak strain isolates, PulseNet and the US Department of Agriculture National Veterinary Service Laboratories (NVSL) databases were queried. Outbreak strain isolates underwent multilocus variable-number tandem repeat analysis (MLVA). Traceback and environmental investigations were conducted at homes, stores, and breeder or broker facilities. We detected 10 cases among residents of eight states and four NVSL GP outbreak strain isolates. One patient was hospitalized; none died. The median patient age was 9.5 (range, 1–61) years. Among 10 patients, two purchased GPs at independent stores, and three purchased GPs at different national retail chain (chain A) store locations; three were chain A employees and two reported GP exposures of unknown characterization. MLVA revealed four related patterns. Tracebacks identified four distributors and 92 sources supplying GPs to chain A, including one breeder potentially supplying GPs to all case-associated chain A stores. All environmental samples were *Salmonella*.
What about in guinea pigs
Animal Samples

- Queried USDA National Veterinary Services Laboratory
  - Did have *Salmonella* isolates from guinea pigs
- Vermont isolated outbreak strain from patients guinea pig
- Oregon had samples from an issue at a guinea pig distributor
Multistate Traceback

- CO
- CO
- VT
- MA

Pet Store Chain 1

CA Distributor

Pet Store Chain 1

CT Distributor

Common Wholesaler
Recommendations for distributors and wholesalers

- Routine monitoring of *Salmonella* in guinea pigs through diagnostic testing
- Improved record keeping to aid in traceback
- Evaluating husbandry and environmental sanitation practices of guinea pig breeders to reduce the prevalence of *Salmonella*
Outbreak Advisory

- CDC, several states, and the U.S. Department of Agriculture Animal and Plant Health Inspection Service are investigating a multistate outbreak of *Salmonella Enteritidis* infections.
  - CDC began investigating in December 2017 when CDC PulseNet identified a cluster of three *Salmonella Enteritidis* infections that whole genome sequencing showed were closely related genetically.
  - A review of the PulseNet database identified six more closely related illnesses dating back to 2015. These illnesses were added to the outbreak case count.
- Nine people infected with the outbreak strain of *Salmonella Enteritidis* have been reported from eight states.
  - Illnesses started on dates ranging from July 17, 2015 to December 15, 2017.
  - One person was hospitalized, and no deaths were reported.
- Epidemiologic and laboratory evidence indicates that contact with pet guinea pigs is the likely source of this multistate outbreak:
  - Four of the seven people interviewed reported contact with a guinea pig or its habitat in the week before getting sick.
  - The outbreak strain of *Salmonella* was identified in a sample collected from an ill person’s pet guinea pig in Vermont.
  - Whole genome sequencing showed that *Salmonella* bacteria isolated from sick people and the guinea pig were closely related genetically. This result provides more evidence that people in this outbreak got sick from contact with pet guinea pigs.
- Whole genome sequencing did not identify predicted antibiotic resistance in 11 of 13 isolates analyzed (9 ill people and 4 guinea pigs). One isolate from a sick person and one isolate from a guinea pig contained genes for resistance to streptomycin, sulfisoxazole, and trimethoprim-sulfamethoxazole. Testing of outbreak isolates using standard antibiotic susceptibility testing by CDC’s National Antimicrobial Resistance Monitoring System laboratory confirmed these results.
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

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.

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.
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.

FOR MORE INFORMATION VISIT:
WWW.CDC.GOV/HEALTHYPETS

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.

Centers for Disease Control and Prevention
National Center for Emerging and Zoonotic Infectious Diseases
The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.