Salmonella Outbreaks Among Persons Exposed to Backyard Flocks: A Preventable Public Health Problem

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Most common bacterial cause of foodborne disease in the U.S.

Many different sources
- Meat, poultry, produce, animal contact

>2,500 serotypes

Not all *Salmonella* infections are laboratory-confirmed
- 1 laboratory-confirmed = ~29 illnesses not reported
Transmission Between Animals and Humans

- **Foodborne**
  - Eating contaminated animal products
    - Meat, milk, eggs, dairy
  - Eating food contaminated by animals near growing fields
    - Fruits, vegetables

- **Direct contact with infected animals**
  - May appear healthy and clean
  - Bodies (fur, feathers, scales) may be contaminated

- **Indirect contact with animals**
  - Environment where animals live and roam
  - Barriers, tank water
People do not have to touch an animal to catch a zoonotic disease.

Direct Contact

Indirect Contact
Salmonella in People

• Acute gastroenteritis: fever, diarrhea (can be bloody), abdominal cramps, vomiting

• Serious illness: bloodstream infection, brain infection, joint infection

• Highest risk: Young children, people with weakened immune systems, seniors >65 years

• Hospitalizations and death can occur
Animals can appear healthy and clean but be carrying germs that can make people sick.
How do we find outbreaks and illnesses?

- National molecular subtyping network for enteric disease surveillance
  - >85 public health and regulatory laboratories

- Molecular subtyping of disease-causing bacteria
  - Pulsed-field gel electrophoresis (PFGE)
  - PFGE pattern = molecular fingerprint for each isolate
Salmonella Typhimurium (PFGE pattern - JPXX01.0622)
Child (1 to 16 years) Case Questionnaire

Notes to Interviewer:
Instructions in bold are for the interviewer only. Please do not read italicized words to the person being interviewed.

- Please complete as much information as possible.
- Please administer this questionnaire to the patient or patient’s caregiver.
- If the respondent cannot remember exact dates, try to approximate to the 1st or 16th of the month, and mark estimate
  said to be.
- For all answers that list multiple choices, please mark all that apply wherever applicable.
- If the case is under 2 years old or less than 12 years of age, ask a parent or guardian the questions in this section. If
  the case is between 12 and 17 years of age, you can ask either a parent or guardian of the child if the parent/guardian gives
  permission to ask the child.

PulseNet ID:
Phone Number(s):
State:
Sex (male/female) Male Female:
Interviewer Name:
Interview Date:

Hello. My name is __________ and I am calling on behalf of the_________ Department of Health. The reason I am calling is because we are currently investigating an outbreak of Salmonella infections in your area. You may have already spoken with someone about your child’s illness, and as we learn more about the illness, we have a few more questions about contact with animals for people who got sick. This will take about 15 minutes or less. Any information provided will remain completely confidential. You don’t have to answer any question that you don’t want to answer, but your answers might help us find the cause of people’s illness and prevent other people from getting sick. Are you willing to participate?

[If “NO”:] There is a better time that we could call back. Date __________ Time __________ AM/PM

[If “STILL NO”:] It should only take about 15 minutes or less and the information you provide could help us find the cause of illness in your area. Date __________ Time __________ AM/PM

[If “YES,” I thank you.] I will begin the questions.

SECTION I: CHILDREN 17 YEARS AND YOUNGER

1. Are you the primary caregiver of the child? □ Yes □ No □ Unknown
   a. (If yes) What is your relationship to the child? [Mark one]
      □ Mother □ Father □ Other [Specify] _ ______
   b. (If not to the primary caregiver, who is the primary caregiver and how you can reach them?)
   c. (If no) Do you feel that you are able to answer questions for the primary caregiver regarding your household and your child’s activities?
      Yes __________ Thank you.
      No __________ I will call the primary caregiver back at __________ Date __________ Time __________ AM/PM
      Thank you for your time.

SECTION II: INTRODUCTORY QUESTIONS

1. How many adults 18 years or older live in your home? __________ adults
2. How many children aged 17 years or younger live in your home? __________ children aged 17 years or younger
3. Does anyone in your household work in the following job? (Read list and mark all that apply.)
   □ Veterinarian/Animal Health worker
   □ Teacher/Day Care Worker
   □ Zoologist
   □ Restaurant worker/Caterer

Please fax this form to 404-639-3535. Attn: Anwaha Lohanjkar (email: alohanjkar@cdc.gov)
Mail-Order Hatchery Industry, United States

- ~20 mail-order hatcheries supply baby birds
- >50,000,000 chicks sold annually
- One hatchery may supply across USA
- Business is booming due to increased demand
  - Backyard flocks
  - Urban chicken phenomenon
- Baby poultry
  - Sold at feed stores
  - Ordered through the mail
  - Sold over the internet
Urban Chickens
NPR Blog: Chicken Diapers? Urban Farming Spawns Accessory Lines (May 1, 2013)

http://www.npr.org/blogs/thesalt/2013/04/30/180135026/chicken-diapers-urban-farming-spawns-accessory-lines
“Celebrity” Pets
Neiman Marcus Beau Coop Heritage Hen Mini Farm

http://www.neimanmarcus.com/christmasbook/media.jsp?itemId=cat45440759&icid=product_beaucoop
USDA-National Poultry Improvement Plan

- Established in 1930's to provide program through which new diagnostic technology could be effectively applied to improvement of poultry and poultry products
- Voluntary partnership between industry and state and federal government
- Program to eliminate poultry diseases from breeder flocks
  - *Salmonella enterica* serotypes Pullorum, Gallinarium and Enteritidis
  - *Mycoplasma gallisepticum*, *Mycoplasma synoviae*, *Mycoplasma meleagridis*, and Avian Influenza
- Does **not** certify freedom from other strains of *Salmonella* in poultry, including those that cause human illness
Since the 1990s, 45 Salmonella outbreaks have been linked to live poultry.

Number of Salmonella Outbreaks per Year

- 1563 illnesses
- 221 hospitalizations
- 5 deaths
Outbreaks of *Salmonella* Associated with Live Poultry

- **Past**
  - First outbreak documented in 1955
  - Outbreaks in Spring
  - Involved young children
  - Dyed birds
  - Pets

- **Present**
  - See multiple outbreaks/year
  - Adults and children
  - Outbreaks year-round
  - Agricultural feed stores
  - Backyard flocks, urban chickens
Outbreaks of *Salmonella* Associated with Live Poultry

- 45 outbreaks reported since 1990
  - 1,563 laboratory-confirmed illnesses
  - 221 hospitalizations
  - 5 deaths

- Poultry appear clean and healthy
- Multiple *Salmonella* serotypes associated
- Multiple outbreak strains linked to single hatcheries
- Recurring hatchery, different outbreak strains
- Success in reducing human illnesses linked to specific hatchery strains
Success Stories

- A couple hatcheries have successfully eliminated certain outbreak strains of *Salmonella* that were repeatedly associated with that specific hatchery
  - Improved biosecurity
  - Working with vet consultant
  - Routine environmental testing
  - Autogenous vaccines
  - Following NPIP guidance
  - Important to customize to the individual hatchery-unique operations
Summary: 2012 Outbreaks of *Salmonella* Infections Linked to Live Poultry from Mail-Order Hatcheries

*Preliminary data, subject to change*

- **8 outbreaks linked to live poultry**
  - Chicks and ducklings, backyard flocks
  - Multiple *Salmonella* serotypes
  - Median time from purchase to illness* = 15 days (range: 3-90)
  - Multiple serotypes of *Salmonella*: Thompson, Hadar, Montevideo, Infantis/Lille/Newport, Infantis, Muenchen, Braenderup

- **517 illnesses reported**
  - Outbreak size range: 20 to 195 ill persons
  - 93 (18%) hospitalized
  - 4 deaths, unclear if infection contributed

*information not available for all outbreaks*
Highlights from 2012 Outbreak Data (n=148)

Preliminary data, subject to change

- 73% reported contact with baby poultry
  - Chicks, ducklings, goslings
- 67% purchased for eggs; 25% for pets; 2% for meat; 6% for other reasons
- 33% kept poultry inside their home
- 30% snuggled with poultry; 9% kissed poultry
- 91% purchased poultry from a store; 7% through mail
Highlights from Recent Outbreak Investigations (2006-2012)

• Caterer contaminated food, caused outbreak in people with no direct live poultry contact (*Salmonella* Montevideo B, 2009)
  – Caterer had backyard flock with chicks from mail-order hatchery associated with outbreak strain
• Chicken contact leading to a foodborne outbreak associated with infected delicatessen workers (*Salmonella* Montevideo B, 2007)
• Poultry flock in daycare cause outbreak (*Salmonella* Johannesburg, 2009)
• Death in nursing home resident, chicks from implicated hatchery brought into nursing home (*Salmonella* multiple, 2012)
• Feed store employees become cases in outbreaks (2006, 2010)
• One sick postal worker who only handled chicks in the mail (*Salmonella* Montevideo A, 2006)
2013 Ongoing Multistate Outbreaks of Human *Salmonella* Infections Linked to Live Poultry*

*preliminary data, subject to change; as of May 24, 2013

- 4 outbreaks under investigation to date in 2013
- 318 illnesses and counting
  - *Salmonella Typhimurium*
    - 198 ill and counting
  - *Salmonella Infantis/Mbandaka*
    - 85 ill and counting
  - *Salmonella Braenderup*
    - 22 ill and counting
    - Same strain as 2012 outbreak
  - *Salmonella Montevideo*
    - 13 ill and counting
    - Same strain linked to chicks as seen in 2007-2010 outbreaks
Challenge to Meet Demands

- **Outsourcing**
  - New flocks – all levels from small scale to commercial operations
  - Trans-shipping of day old chicks through hatchery

- **Drop Shipping**
  - Common practice in hatchery industry
  - Hatchery A can not complete customer order because no birds are available
  - Hatchery A contacts Hatchery B for availability
  - Hatchery B ships order to customer under Hatchery A name
  - Can be challenge for traceback to hatchery
Prevention and Control

- Mail-order hatcheries
- Feed stores
- Consumers
Potential *Salmonella* Sources

- Chicks
- Other Poultry, Livestock & Pets
- Feed
- Housing
- Rodents
- Water
- Wild birds
- Equipment & Vehicles
- Hatchery
- People
- Litter
- Insects

Slide courtesy of Dr. Andrew Rhorer
Intervention Strategies at Mail-Order Hatcheries

- Clean-up efforts should be customized to individual hatcheries
- Monthly Environmental Samples
  - Flocks and hatchery
  - Participate in voluntary US *Salmonella* Monitored Program
- Autogenous Vaccine
- Rodent Control Enhancement
- Feed intervention
- Hatching Egg Disinfection
- Work Flow in Hatchery
- Air Movement in Hatchery
- Hatchery Cleaning and Disinfection
- Consulting with Poultry Veterinarian
USDA NPIP Proposed Voluntary *Salmonella* Monitoring Program

- Establishing a U.S. *Salmonella* Monitored program and classification for mail-order hatcheries will allow them to practice a defined program for the prevention and control of *Salmonella*

- Proposes minimum environmental sampling

- Currently waiting for determination of public comment period
Feed Store Poultry Sales - Past
Recommendations for Feed Stores

While raising backyard poultry can be a great experience, it is important that feed store employees do some simple things to help protect themselves and their customers:

- Circulate educational flyer on safe handling to all customers purchasing live poultry
- Place educational posters near areas where birds are displayed in clear view
- Offer hand washing stations or hand sanitizer next to poultry display areas and tell customers to wash hands right after leaving the poultry display area.
- Display birds out of reach of customers, especially children, so customers can not easily touch birds
- Follow advice in 2011 Compendium of Measures to Prevent Diseases Associated with Animals in Public Settings
After you touch ducklings or chicks, wash your hands so you don’t get sick!

- Contact with live poultry (chicks, chickens, ducklings, ducks, quail, turkey) can be a source of human illness.
- Salmonella genus in people that can be threatening.
- Chicks, ducklings, Salmonella genus clean.
- Salmonella genus can easily contaminate areas where children play.

Protect Yourself and Your Family for Salmonella

**DO:**
- Wash your hands thoroughly with soap and water right after handling live poultry or anywhere in the area where they live and roam.
- 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.
- Clean any equipment or materials associated with raising or caring for live poultry outside the house, such as cages or feed or water containers.

**DON’T:**
- Don’t let children, elderly persons and people with weakened immune systems handle live poultry.
- Don’t let live poultry or especially injured animals in unsanitary outdoor patios.
- Don’t smuggle or eat or drink animal products.

For more information, call 1-800-CDC-INFO or visit www.cdc.gov.

Si toca pollitos o patitos, ¡lávelse las manos para no enfermarse!

- El contacto con aves de corral vivas (como pollitos, gallinas, patos, patos, gansos y pavos) puede ser una fuente de infección.
- Las bacterias de Salmonella pueden contaminar grasas o incluso la ropa.
- Los pollitos, los patos pueden ser portados vean sanas y limpias.
- Las bacterias de Salmonella pueden contaminar igual las áreas que los animales.

**Protejase usted y su familia de los microbios**

**LO QUE DEBE HACER:**
- Lave sus manos cuidadosamente con agua y jabón inmediatamente después de tocar aves de corral vivas o cualquier objeto ubicado en el área en que habitan o frecuentan.
- Los adultos deben vigilar que los niños pequeños se laven bien las manos.
- Si no hay agua ni jabón, use un producto limpiador para manos hasta que se pueda lavar bien con agua y jabón.
- Limpie todos los equipos o materiales fuera de la casa que use el cuidado y crianza de las aves de corral, como las jaulas o los recipientes para agua o alimentos.

**LO QUE NO DEBE HACER:**
- No deje que los niños ni los ancianos o las personas con inmunidad debilitadas toquen aves de corral.
- No mantenga aves en el jardín que no esté preparado, sirve o sea como la cocina o los comederos.
- No abrace ni beba de la comida o beba cerca.

**Protégez votre famille et vous-même contre les microbes**

**À FAIRE:**
- Lavez-vous les mains avec de l’eau et du savon immédiatement après avoir touché de la volaille ou n’importe quoi dans leur environnement.
- Un adulte devrait apprendre aux jeunes enfants à se laver les mains.
- Si l’eau et le savon font défaut, utilisez du gel hydroalcoolique en attendant. Ensuite, lavez-vous bien les mains avec de l’eau et du savon dès que vous le pouvez.

**À NE PAS FAIRE:**
- Ne laissez pas les jeunes enfants de moins de 5 ans, les personnes âgées ou les personnes avec un système immunitaire affaibli toucher ou tenir des poussins, canetons ou autres volailles.
- Ne laissez pas la volaille entrer dans la maison, dans les salles de bains et surtout dans les endroits où la nourriture ou les refraîchissements sont préparés, servis ou conservés comme la cuisine ou la terrasse.
- Ne clôturez pas ni emmenez les oiseaux aux enfants, ne touchez pas votre bouche, ne mangez pas et ne buvez pas près de la volaille.

For more information, call 1-800-CDC-INFO or visit www.cdc.gov.
What do these two things have in common?

Click here to find out what these 2 things have in common.
Zoonotic Diseases (Diseases from Animals)

Gastrointestinal (Enteric) Diseases from Animals

Animals provide many benefits to people. However, some animals can carry diseases that can be shared with people. Zoonotic diseases or zoonoses are diseases caused by germs (pathogens) that can be spread between animals and humans. Many germs have been responsible for illnesses and outbreaks, including Salmonella, E. coli O157:H7, and Cryptosporidium. These germs can come from many types of animals, including pets, wild animals, and farm animals. Did you know that infected animals can make you sick, even if they appear healthy and clean?

Zoonotic diseases can cause many different illnesses in people. Gastrointestinal (enteric) zoonoses are one type of illness that can upset the digestive system (stomach and intestines) and can make people sick.

Outbreaks
Selected Multistate Outbreak Investigations Linked To Animals and Animal Products

Education
Educational Materials and Other Resources
2012-2013
Selected *Salmonella* Outbreak Investigations

Reports of Selected *Salmonella* Outbreak Investigations

**2013**
- *Tahini Sesame Paste* – *Salmonella* Montevideo and *Salmonella* Mbandaka
- **Live Poultry** – *Salmonella* Typhimurium
- **Live Poultry** – *Salmonella* Infantis and *Salmonella* Mbandaka
- *Cucumbers* – *Salmonella* Saintpaul
- *Chicken* – *Salmonella* Heidelberg
- **Ground Beef** – *Salmonella* Typhimurium

**2012**
- *Peanut Butter* – *Salmonella* Bredeney
- *Hedgehogs* – *Salmonella* Typhimurium
- *Mangoes* – *Salmonella* Braenderup
- *Cantaloupe* – *Salmonella* Typhimurium and *Salmonella* Newport
- **Ground Beef** – *Salmonella* Enteritidis
- **Live Poultry** – *Salmonella* Hadar
- **Live Poultry** – *Salmonella* Montevideo
- **Live Poultry** – *Salmonella* Infantis, *Salmonella* Newport, and *Salmonella* Lille

**Related Links**
- CDC OutbreakNet
- Division of Foodborne, Waterborne, and Environmental Diseases
- Foodborne Illness A-Z
- Estimates of Foodborne Illness
- Foodsafety.gov
- Report a Foodborne Illness
- U.S. Food and Drug Administration (FDA)
- USDA Food Safety and Inspection Service
Keeping Backyard Poultry

Live poultry, such as chickens, ducks, geese, and turkeys, often carry harmful germs called Salmonella. After you touch a bird, or anything in the area where they live and roam, wash your hands so you don’t get sick!

An increasing number of people around the country are choosing to keep live poultry, such as chickens or ducks, as part of a greener, healthier lifestyle. While you enjoy the benefits of backyard chickens and other poultry, it is important to consider the risk of illness, especially for children, which can result from handling live poultry or anything in the area where they live and roam.

It's common for chickens, ducks, and other poultry to carry Salmonella, which is a type of germ that naturally lives in the intestines of poultry and many other animals and is shed in their droppings or feces. Even organic fed poultry can have Salmonella. While it usually doesn't make the birds sick, Salmonella can cause serious illness when it is passed to people.

Salmonella can make people sick with diarrhea, vomiting, fever, and/or abdominal cramps. Sometimes, people can become so sick from a Salmonella infection that they have to go to the hospital.
After you touch ducklings or chicks, wash your hands so you don’t get sick!

- Wash your hands thoroughly with soap and water right after handling live poultry or anything that comes into contact with the birds.
- 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.

Protect Yourself and Your Family from Germs

**Did:**
- Wash your hands thoroughly with soap and water right after handling live poultry or anything that comes into contact with the birds.
- 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.
- Clean any equipment or materials associated with raising or caring for live poultry outside the house, such as cages or feed or water containers.

**DONT:**
- Don’t let children younger than 5 years of age, elderly persons, or people with weak immune systems handle or touch live poultry, ducklings, or other live poultry.
- Don’t let live poultry inside the house, in bathrooms, or especially in areas where food is prepared, served, or stored, such as kitchens, or on carpets or countertops.
- Don’t wash or rinse the birds, touch your mouth, eat or drink around live poultry.
Growing Chicks into Healthy Chickens: Getting Ready for Spring!

February 28, 2013

USDA
United States Department of Agriculture
Animal and Plant Health Inspection Service
Reaching Backyard Flock Owners

- > 100,000 subscribers
- Public Service Announcement released in the Oct/Nov 2012 issue
Healthy Chickens Bulletin

Helpful Hints for Healthy Poultry

Dear Healthy Chickens Bulletin readers,

The Centers for Disease Control and Prevention (CDC) has asked us to run a public service announcement regarding the risks associated with handling live poultry and any areas where they live. Like any other animal, poultry can carry Salmonella germs. The purpose of this information is not to scare you out of keeping poultry, but to remind everyone that there is a potential for illness with birds just as there is with any other animal.

Elaine Belanger, Editor: Backyard Poultry

Tips From the CDC

After you touch ducklings or chicks, wash your hands so you don’t get sick!

Contact with live poultry (chicks, chickens, ducklings, ducks, geese, and turkeys) can be a source of human Salmonella infections.

**Salmonella germs can cause a diarrheal illness in people that can be mild, severe, or even life threatening.**

**Chicks, ducklings, and other live poultry can carry Salmonella germs and still appear healthy and clean.**

**Salmonella germs are shed in their droppings and can easily contaminate their bodies and anything in areas where birds live and roam.**

Protect Yourself and Your Family from Salmonella

See more about Healthy Chickens Bulletin.
As the National Spokesperson for the USDA-APHIS Bio-Security for Birds Program, I was informed by my contact at the CDC that there is currently another outbreak of salmonella linked to live poultry. They are actively checking the DNA of the... See More


DO YOU FEEL LUCKY? Today, I will be announcing the winner of the April Chicken Coop Contest sponsored by My Pet Chicken! I will attempt to call the winner "LIVE" on my radio show today. (No, you do not have to listen live or be available to win.) I will also post the winner here on my facebook fan page after the broadcast. Good luck to everyone that entered!

Like · Comment · Share
45 people like this.
View 16 more comments

Tina McElhatan Very happy for the winner! Sounds like perfect timing and a good start for this family moving to the country. And made in the USA, sweet!
May 3 at 12:31pm via mobile · Like

Taylor Vlahos call me maybe?
May 3 at 3:36pm via mobile · Like · 2

Write a comment...

APRIL CHICKEN COOP CONTEST - FINAL STEPS! Now that you have collected all 30 secret passwords, and have figured out the secret message contained within the 30 secret passwords, send an e-mail to contest@chickenwhisperer.net with your name, shipping address, and phone number, and of course the 30 secret passwords and secret message contained within the secret passwords. You have until 11:59pm EST tonight (Thursday) to
Conclusions

- Human *Salmonella* infections associated with live poultry contact are an important public health problem
  - Serious human illness, hospitalizations, and death
  - Young children, people with weakened immune systems and seniors are at higher risk for serious illness
- Mail-order hatcheries, feed stores, and venues that sell or display poultry, and consumers are all involved in prevention
- Educational posters should be distributed widely
- Human illnesses can be reduced using interventions customized at the mail-order hatchery level
- US *Salmonella* Monitored Program will be critical importance by allowing mail-order hatcheries to practice a defined program for the prevention and control of *Salmonella*
Acknowledgments

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The findings and conclusions in this presentation are those of the authors and do not necessarily represent the views of the CDC.