Backyard Flocks and Salmonellosis: A Growing Public Health Concern

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One Health: The Way Forward

A multidisciplinary collaborative effort that focuses on the interconnectedness of a large ecosystem to achieve optimal health of humans, animals, and environments across the world.
Backyard Flocks

- Poultry
  - Chickens
  - Ducks
  - Turkeys
  - Geese
  - Others…
Backyard Flocks

- **Small scale poultry operations**

- **Birds kept at**
  - Single-family homes
  - Multifamily dwellings
  - Community coops
  - School settings
Increasing Popularity of Live Poultry

Google Trends: “backyard chickens’ as of August 28, 2013
2010 Study on Backyard Flock Ownership

- Survey of 4 major U.S. cities
- 1% of all households owned chickens
- 4% of households without chickens planned to have chickens within next 5 years
- Majority of respondents raising chickens 5 years or less

Reasons for Having Backyard Flocks

- Fun hobby
- Better quality food
- Eggs or meat
- Animal welfare concerns
- Learning experience for kids
- Environmental concerns
- Family tradition

Neiman Marcus Beau Coop Heritage Hen Mini Farm

http://www.neimanmarcus.com/christmasbook/media.jsp?itemId=cat45440759&icid=product_beaucoop
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
  - Sold over the internet
Live Baby Poultry Sales at Agricultural Feed Stores

- Mail-order hatchery minimum purchase requirements

- Requirements lower at feed stores
  - Sell chicks, ducklings, etc.
  - Spring, sometimes fall “chick days”
  - Sales peak in spring, decline in winter

- Opportunities for cross-contamination in store displays
Shipment of Live Baby Poultry

- Shipped by US Postal Service
- Cardboard boxes
  - 100-120 chicks
  - 80 turkey pouls
  - 60 ducklings
  - 32 goslings
- One box may contain multiple species
- Opportunities for cross-contamination during shipment
Direct and Indirect Contact Lead to Human Infection

Direct Contact

Indirect Contact
Urban Chickens
“Celebrity” Pets
Outbreaks of *Salmonella* Associated with Live Poultry

- **Past**
  - First outbreak documented in 1955
  - Outbreaks in Spring
  - Young children
  - Dyed birds
  - Pet chicks and ducklings
Outbreaks of *Salmonella* Associated with Live Poultry

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  - Young children
  - Dyed birds
  - Pet chicks and ducklings

- **Present**
  - Large, multistate outbreaks
  - Outbreaks year-round
  - Adults and children
  - Agricultural feed stores
  - Backyard flocks, urban chickens

Number of Outbreaks

Year

Number of Cases

0 1 2 3 4 5 6 7 8 9 10

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

**Number of *Salmonella* Outbreaks per Year**

- 1581 illnesses
- 221 hospitalizations
- 5 deaths
2013 Multistate Outbreaks of Human *Salmonella* Infections Linked to Live Poultry*

*preliminary data, subject to change; as of November 5, 2013

- 584 illnesses total in 4 outbreaks
- Largest # of illnesses in single year to date
  - *Salmonella Typhimurium*: 356 ill
    - Largest documented outbreak ever
    - Complicated traceback
    - 113 feed store locations representing 33 companies, birds sourced from 18 hatcheries
  - *Salmonella Infantis/Mbandaka/Lille/Newport*: 158 ill
    - Linked to Ohio hatchery
    - Previous outbreaks, annually since 2009
  - *Salmonella Braenderup*: 53 ill
    - 2012 outbreak
  - *Salmonella Montevideo*: 22 ill
    - 2007-2010 outbreaks
Outbreaks of *Salmonella* Associated with Live Poultry

- Poultry appear clean and healthy
- Multiple *Salmonella* serotypes associated
  - Serogroup C most common
- >95% of poultry purchased at farm and feed stores
- Unique outbreak strains linked to single hatcheries
- Recurring hatchery, different outbreak strains
- Success in reducing human illnesses linked to specific hatchery strains
Two mail-order hatcheries successfully eliminated outbreak strain that was repeatedly linked with their hatchery

- Improved biosecurity
- Worked with vet consultant
- Conducted routine environmental testing
- Administered autogenous vaccines
- Followed NPIP guidance
- Customized interventions to individual hatchery
Highlights from Recent Outbreak Investigations (2006-2013)

- 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)
One Health Outbreak Investigations: Live Poultry-Associated Salmonellosis

- Goals of investigations are to collect 3 lines of evidence
  - Epidemiologic
  - Traceback
  - Laboratory
Traceback Investigations: Feed Store Questionnaire

- Feed stores
  - Species sold
  - Months sold
  - Numbers sold
  - Mail-order hatchery sources

- Critical to continue collecting this data even after poultry linked to outbreak
Voluntary partnership between industry and state and federal government

New diagnostic technology applied to improvement of poultry and poultry products

Program to eliminate poultry diseases from breeder flocks
- *Salmonella enterica* serotypes Pullorum, Gallinarium and Enteritidis
- *Mycoplasma gallisepticum*, *Mycoplasma synoviae*, *Mycoplasma meleagrisidis*, and Avian Influenza

Does not certify freedom from other strains of *Salmonella* in poultry, including those that cause human illness
Mail-Order Hatchery Industry Challenge to Meet Demands

- **Outsourcing**
  - New flocks—all levels from small scale to commercial operations

- **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

- **Other practices**
  - Trans-shipping of hatched chicks through hatchery
  - Multiplying with introduction of outside breeder birds
Environmental Sampling of Live Poultry and Their Environments

- **Where to sample**
  - Patient homes
  - Farm and feed stores
  - Mail-order hatcheries

- **What to sample**
  - Environmental drag swabs of pens
  - Chick papers from shipping boxes
  - Fecal material, litter, dust in cages or coops
  - Cloacal swabs from individual birds
One Health Approach to Zoonotic Salmonellosis Prevention and Control

- Mail-order hatcheries
- Feed stores
- Consumers
- Health professionals
After you touch ducklings or chicks, wash your hands so you don’t get sick!

DO:
- Wash your hands thoroughly with soap and water right after touching live poultry or anything 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.

DONT:
- Don’t let children handle live poultry, even if the children are old enough to handle them.
- Don’t let children eat or drink around live poultry.
- Clean any equipment or materials associated with raising or caring for live poultry outside the house, such as cages or feed or water containers.

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

www.cdc.gov/zoonotic/gi
Shipping

Salmonella

Education

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 Germs

**DO:**

- Wash your hands thoroughly with soap and water right after touching live poultry or anything 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 younger than 5 years of age, elderly persons, or people with weak immune systems handle or touch chicks, ducklings, or other live poultry.
- Don't 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.
- Don't snuggle or kiss the birds, touch your mouth, or eat or drink around live poultry.

For more information, call 1-800-CDC-INFO or visit www.cdc.gov.
Recommendations for Mail-order Hatcheries

- Consult with a poultry veterinarian to customize interventions
- Follow NPIP guidance
- Biosecurity
  - Cleaning and disinfection protocols
  - Ventilation and structural improvements
  - Enhanced pest control
  - Improved husbandry
  - Employee movement and work flow controls
- Vaccination
- Monthly environmental samples
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*
  - Help address *Salmonella* strains of human health concern

- Proposes minimum environmental sampling

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

- **Live poultry displays**
  - Keep live poultry out of reach of customers
  - Hang *Salmonella* educational posters in clear view
  - Routinely clean and disinfect display areas

- **Hand washing**
  - Offer hand washing stations or hand sanitizer next to live poultry displays
  - Tell customers to wash hands right after leaving area

- **Distribute *Salmonella* educational materials to all customers buying live poultry**
Recommendations for Agricultural Feed Stores

- Feed store letter template for state and local partners
  - Distributed annually
  - Available upon request

- Advice available in 2013

Compendium of Measures to Prevent Disease Associated with Animals in Public Settings
Feed Store Poultry Sales - Present
Consumer Messaging Based on Outbreaks

- Know that backyard poultry can carry germs that can make people sick, even if the birds are healthy.
- Follow these simple steps to enjoy your backyard flocks without getting sick:
  - Wash your hands right after handling poultry or anything in their living area.
  - Keep birds outside of your house!
  - Do not kiss poultry!
  - Do not eat or drink around live poultry.
  - Safely clean up after poultry.
- Keep birds out of schools with children under 5 years.

Additional recommendations available at www.cdc.gov/features/Salmonellapoultry

Photo courtesy of Dr. Joni Scheftel, MN
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, but 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 organically 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.
Gastrointestinal Diseases from Animals

http://www.cdc.gov/zoonotic/gi/

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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 0157: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.

Additional Resources

- Healthy Pets Healthy People
- Reports of Selected Salmonella Outbreak Investigations
- Multistate Foodborne Outbreak Investigations
- Compendium of Measures to Prevent Disease Associated with Animals in Public Settings, 2011 [PDF - 28 pages]
- Clean Hands Save Lives
- Feature: Wash Your Hands
- CDC-TV: Put Your Hands Together

Outbreaks

Selected Multistate Outbreak Investigations Linked To Animals and Animal Products

Animals

Information for Selected Animals and Animal Products

Education

Educational Materials and Other Resources

Places

Information about Common Places Germs are Spread
Selected *Salmonella* Outbreak Investigations

Reports of Selected *Salmonella* Outbreak Investigations

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

2012
- **Peanut Butter** – *Salmonella* Bradeny
- **Hedgework** – *Salmonella* Typhimurium
- **Mangles** – *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
- **Dry Dog Food** – *Salmonella* Infantis
- **Raw Spelled Ground Tuna Product** – *Salmonella* Bareilly and *Salmonella* Nchanga
- **Small Turtles** – *Salmonella* Sandiego, *Salmonella* Pomena, and *Salmonella* Poona
- **Beef Jerky Chicken** – *Salmonella* Enteritidis
Meet your new neighbors

Chickens are moving from the henhouse to the backyard and looking for veterinary care

By Joe Kaiser

Increasing Awareness among Health Professionals

How to protect patients, families from enteric zoonoses

By Karen P. Neill, M.D., M.S.P.H., FAAP

Pediatricians can alert children and their families to emerging issues they may not be aware of that can help prevent illness. One such issue is an increased number of enteric illness outbreaks detected by public health surveillance that are linked to pet ownership and animal contact.

Roughly 74 million U.S. households have one or more pets, according to the American Veterinary Medical Association. Pet ownership and other types of animal contact provide many benefits to people. However, certain animals are not appropriate pets for high-risk groups, including children under 5 years of age, immunocompromised persons and adults over 65 years of age.

Enteric illnesses such as Salmonella, Escherichia coli O157:H7 and Campylobacter are most commonly transmitted through contaminated food. However, these bacteria are among the many zoonotic pathogens that pets and other animals can spread to people. Illnesses and outbreaks of zoonotic diseases (i.e., zoonoses) have been linked to exposure to many different kinds of animals in public and private settings (MMWR Recomm Rep. 2011;60(RR-04):1-24).

In addition to pet ownership, public venues such as animal exhibits, farms, stores, schools and child care facilities offer opportunities for children to contact animals. Petting zoos and backyard poultry flocks also are becoming increasingly popular.

While pets can provide many benefits, some animals can carry enteric zoonotic pathogens that can spread to people. Pediatricians have a role in educating patients and their families about the risks for contracting Salmonella infection associated with certain pets, including rodents such as mice, hamsters and gerbils.
Final Remarks

- Human salmonellosis associated with live poultry an important and preventable public health issue
  - Serious human illness, hospitalizations, death

- Prevention and control efforts depend on integrated One Health approach

- Educational materials should be distributed widely

- Interventions at mail-order hatcheries and agricultural feed stores can reduce human illnesses
Acknowledgments

State and local public health agencies
State Departments of Agriculture
Mail-order hatchery owners
PulseNet
USDA-APHIS
USDA-NPIP
CDC: DFWED, ORPB, EDLB

http://cnnphotos.blogs.cnn.com/2013/11/06/chicken-portraits/

The findings and conclusions in this presentation are those of the authors and do not necessarily represent the views of the CDC.
Hatchery Cin Ohio 2009--Present

- >490 illnesses over 5 years
  - *Salmonella* Johannesburg, 2009
  - *Salmonella* Typhimurium, 2009-2010
  - *Salmonella* Altona/Johannesburg, 2011
  - *Salmonella* Lille, Newport, Infantis, 2012
  - *Salmonella* Lille, Newport, Infantis, Mbandaka, 2013