

Love the Pets, Not the Germs: CDC Update on Enteric Zoonoses

Clinician Outreach and Communication Activity (COCA) Webinar July 17, 2014

Office of Public Health Preparedness and Response
Division of Strategic National Stockpile



Objectives

At the conclusion of this session, the participant will be able to accomplish the following:

- ❑ Describe the epidemiology and clinical features of enteric zoonoses**
- ❑ Discuss recent enteric outbreaks involving animal contact in the U.S.**
- ❑ State how the concept of 'One Health' approach links clinicians, veterinarians, epidemiologists, and other healthcare professionals**
- ❑ Identify prevention messages and materials supporting safe human and animal interaction**

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TODAY'S PRESENTER



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TODAY'S PRESENTER



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Love the Pets, Not the Germs: CDC Update on Enteric Zoonoses

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BACKGROUND

What are Enteric Zoonoses?



- ❑ Enter body through the mouth and intestinal tract
- ❑ Gastrointestinal symptoms

- ❑ Transmission of pathogens from animals to humans; likely resulting in human disease

Signs/Symptoms of Enteric Zoonoses

- ❑ **Gastrointestinal tract symptoms are most common**
 - Vomiting
 - Diarrhea (may be bloody and/or persistent)
 - Abdominal pain
 - Weight loss, dehydration
 - Fever, bloodstream infection
 - Joint infection
 - Hemolytic-Uremic Syndrome
 - Guillan-Barré
 - Respiratory infection
 - Meningitis

EVERYONE is at Risk

- ❑ **People MOST at risk include:**
 - Children under the age of 5 years
 - Elderly
 - Immunocompromised
 - Pregnant women

Foodborne Infections: Common, Costly, and Preventable



□ Foodborne Illness¹

- 48 million illnesses
- 128,000 hospitalized
- 3,000 deaths
- Estimated cost \$77.7 billion²

¹Scallan et al (2011) EID 17: 7-15, 16-22

²Hoffman et al (2012) J Food Prot 75:7, 1292-1302

United States Pet Statistics

- ❑ **74.1 million U.S. households include ≥ 1 pets¹**
 - **Dog Ownership: 43.3 million**
 - **Cat Ownership: 36.1 million**

- ❑ **U.S. population animal exposure in past 7 days²**
 - **61.1% report Dog exposure**
 - **41% report Cat exposure**
 - **16.2% report handling dog treats**

¹2012 US Pet Ownership & Demographics Sourcebook, AVMA

²FoodNet Population Survey. HHS, CDC, 2006-2007.

Other Animal Exposures



Human Illness and Animal Contact

- **14% of all enteric illnesses, caused by seven major pathogens in US, attributable to animal contact¹**
 - *Salmonella* species (Nontyphoidal)
 - Shiga-toxin producing *Escherichia coli* (STEC) 0157
 - STEC non-0157
 - *Listeria monocytogenes*
 - *Campylobacter* species
 - *Cryptosporidium* species
 - *Yersinia enterocolitica*
- **Enteric Zoonoses**
 - **About 6.7 million illnesses due to animal contact**

¹Hale et al. CID 2012; 54 (Suppl 5):S472-S479

Zoonotic Salmonellosis

- ❑ **11% of *Salmonella* infections due to animal contact**
 - **Highest morbidity and mortality among enteric zoonoses**
 - **Children disproportionately affected**



Hale et al., 2012

Animal *Salmonella* Infections

- ❑ **Lives in intestinal tract of many different animals**
- ❑ **Asymptomatic carriers, animals appear healthy and clean**
- ❑ ***Salmonella* bacteria are shed in animals feces**
 - **Easily contaminate their bodies (fur, feathers, and scales) and anything in areas where animals live and roam**
 - **Shed intermittently , stress increases shedding**
- ❑ **Salmonellosis can occur in some animals**
 - **3 major syndromes—septicemia, acute enteritis, and chronic enteritis**



TRANSMISSION

Transmission Between Animals and Humans

❑ Foodborne

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



Transmission Between Animals and Humans

❑ Direct contact with infected animals

- May appear healthy and clean
- Bodies (fur, feathers, scales) may be contaminated
 - Fur, hair, feathers, scales, skin, saliva, feces
 - Animal bedding, flooring, barriers, shoes/clothing



❑ Indirect contact with animals

- Environment where animals live and roam
- Barriers, tank water



OUTBREAK INVESTIGATION PROCESS

One Health

- ❑ **Integrative effort of multiple disciplines working locally, nationally, and globally to attain optimal health**
- ❑ **A “One Health” approach considers human, animal, and environmental health**
- ❑ **Multiple disciplines**
 - Healthcare professionals
 - Veterinarians
 - Epidemiologists
 - Environmental scientists
 - And many more...

One Health – A Way Forward



A One Health Approach is critical for effective detection, control, and prevention of infectious diseases.

PulseNet



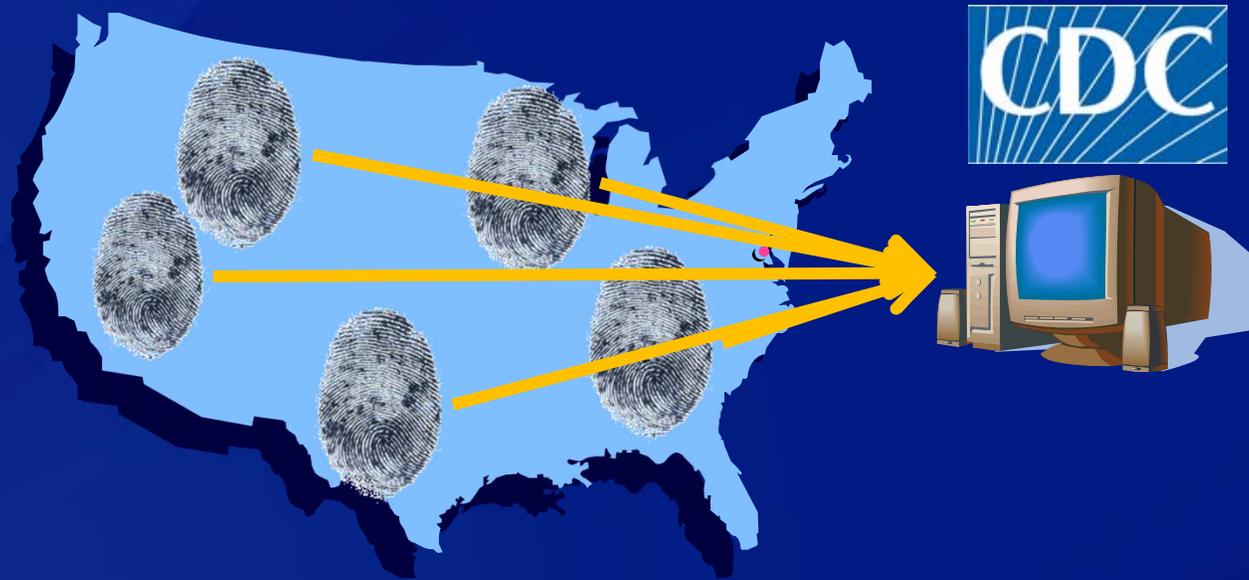
- ❑ **National molecular subtyping network for foodborne disease surveillance**
 - >80 public health and regulatory laboratories
- ❑ **Perform molecular subtyping of foodborne disease-causing bacteria**
 - Human clinical isolates and some non-human isolates (food, animals, environment)
 - Pulsed-field gel electrophoresis (PFGE)
 - Create PFGE pattern (DNA fingerprint) for each isolate



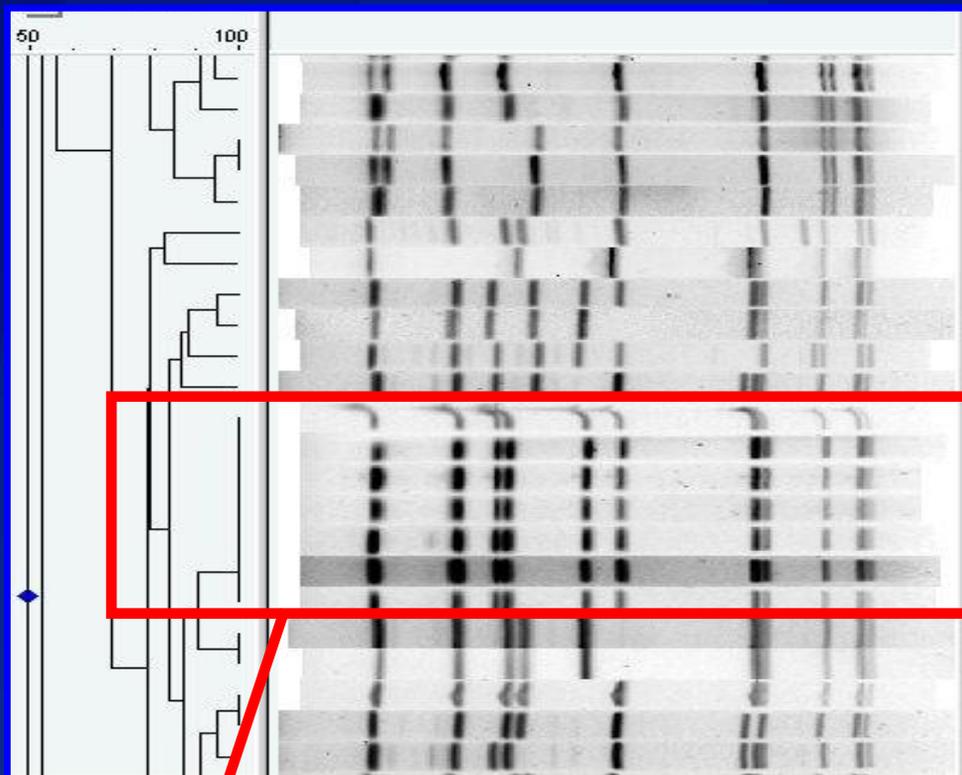
PulseNet



- ❑ DNA “fingerprints” electronically uploaded to national database at CDC
- ❑ Shared among members



PulseNet Data Analysis: Searching for Clusters



Cluster of indistinguishable patterns

- ❑ Monitors for similar patterns in past 2–4 months
- ❑ When cluster identified, PulseNet notifies epidemiologists
- ❑ Members can query PulseNet database for specific PFGE patterns

Inherent Delays in Surveillance Timeline for Reporting Cases



By the time patient interviews conducted, epidemiologists are often asking about exposures ~3 weeks prior

Hypothesis Generation

- ❑ **Must consider large number of exposures**
 - Need to narrow list to exposures reported by many patients
- ❑ **Interview**
 - Find out where and what ill patients came into contact with or ate before they got sick
 - Hypothesis-generating structured questionnaire
 - >400 exposure items
 - Food and animal exposures
 - Travel, events, grocery stores, restaurants
 - Intensive open-ended interviews
 - Illness history
 - Detailed exposure history
- ❑ **Review interview data for common exposures**
 - Focused structured questionnaire

Case-Control Study

- **Study that compares two groups of people:**
 - **Cases**: persons diagnosed with disease
 - **Controls**: similar group of people without disease
- **Study medical and lifestyle histories to determine what risk factors may be associated with the disease**

Federal Roles



- Disease surveillance
- Outbreak detection
- Outbreak investigation
- Education and training of public health staff



- Food safety policies
- Inspection and enforcement
- Traceback investigations
- Product recalls
- Investigation of production facilities

Role of Healthcare Providers

- ❑ Small number of people with GI symptoms seek medical care**
- ❑ Implication of a specific source is difficult from a single patient encounter**
- ❑ Every outbreak begins with index case; this patient may present to you**

Role of Healthcare Providers

- ❑ **Important clues to determining etiology:**
 - Incubation period
 - Duration of the resultant illness
 - Predominant clinical symptoms
 - Additional clues about animal contact, hand-washing, and foods eaten
- ❑ **If enteric zoonosis or foodborne illness is suspected, submit appropriate specimens for laboratory testing and contact the state or local health department**

When laboratory testing may be helpful

❑ Signs/Symptoms:

- Bloody diarrhea, Weight loss, Fever
- Diarrhea leading to dehydration
- Prolonged diarrhea (3 or more stools/day, for several days)
- Severe abdominal pain
- Immunocompromised patient

❑ Laboratory protocols:

- Routine stool testing may only include screening for *Salmonella*, *Shigella*, *Campylobacter jejuni/coli*
 - Cultures for other species may require additional media or incubation

RECENT OUTBREAKS

Recent Enteric Zoonotic Outbreaks



Live Poultry-Associated Salmonellosis Outbreaks

- ❑ **Past (1955–1990)**
 - **Few outbreaks**
 - **Spring**
 - **Young children**
 - **Dyed birds, pets**



Live Poultry-Associated Salmonellosis Outbreaks

□ Past (1955–1990)

- Few outbreaks
- Spring
- Young children
- Dyed birds, pets



□ Present (1990–2013)

- Multiple multistate outbreaks
- Year-round
- Adults and children
- Backyard flocks, pets



Backyard Poultry

- ❑ Small flocks of <50 birds
- ❑ Increase in urban and suburban settings
- ❑ Popular with organic and locally sourced food movements

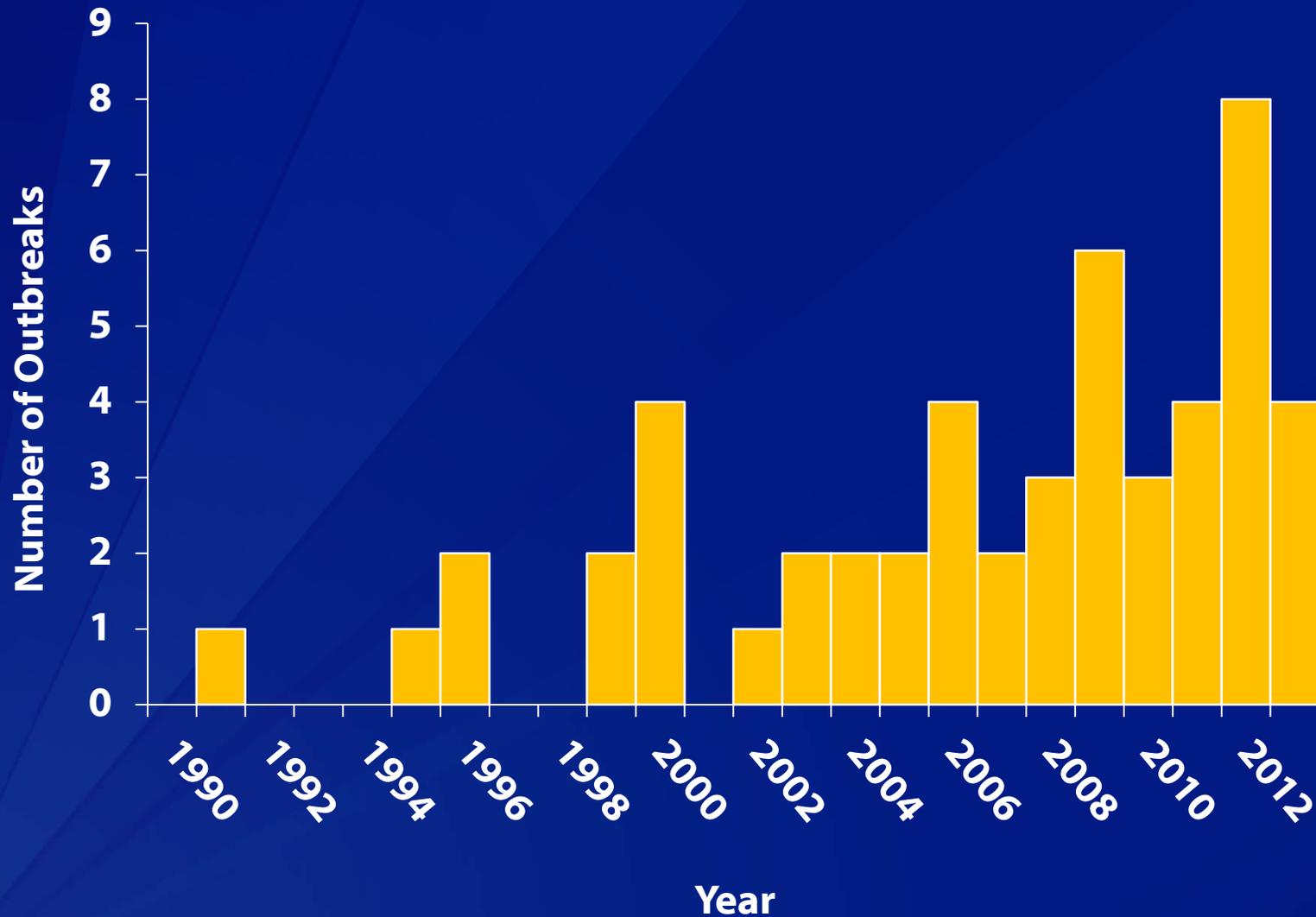


Poultry Popularity

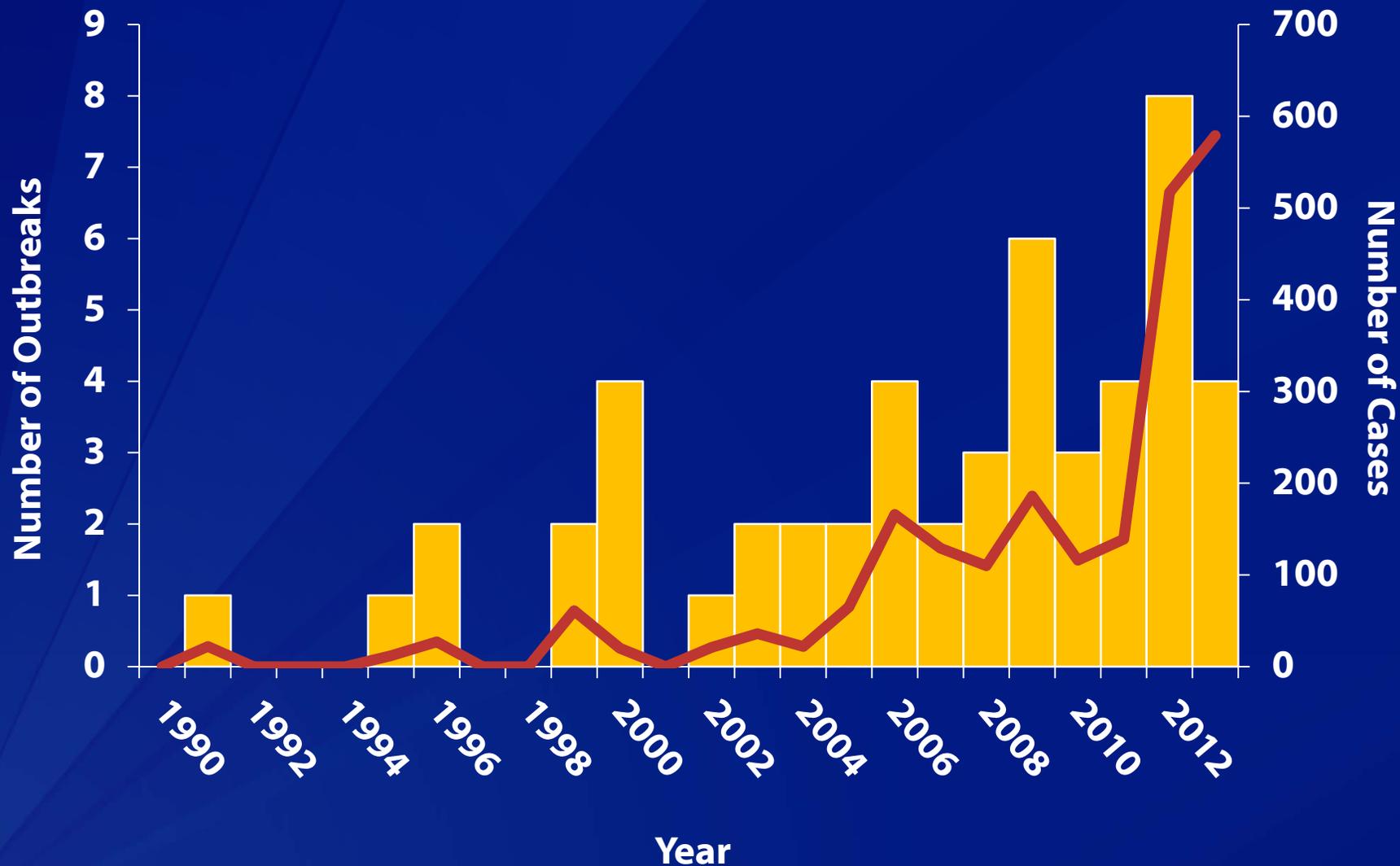


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Live Poultry-Associated Outbreaks — United States, 1990–2013



Live Poultry-Associated Outbreaks and Outbreak Associated Cases — United States, 1990–2013



Results

Outbreaks

n=51

Illnesses

2,228

Hospitalizations

306

Deaths

5

**Median number of illnesses
(range)**

25

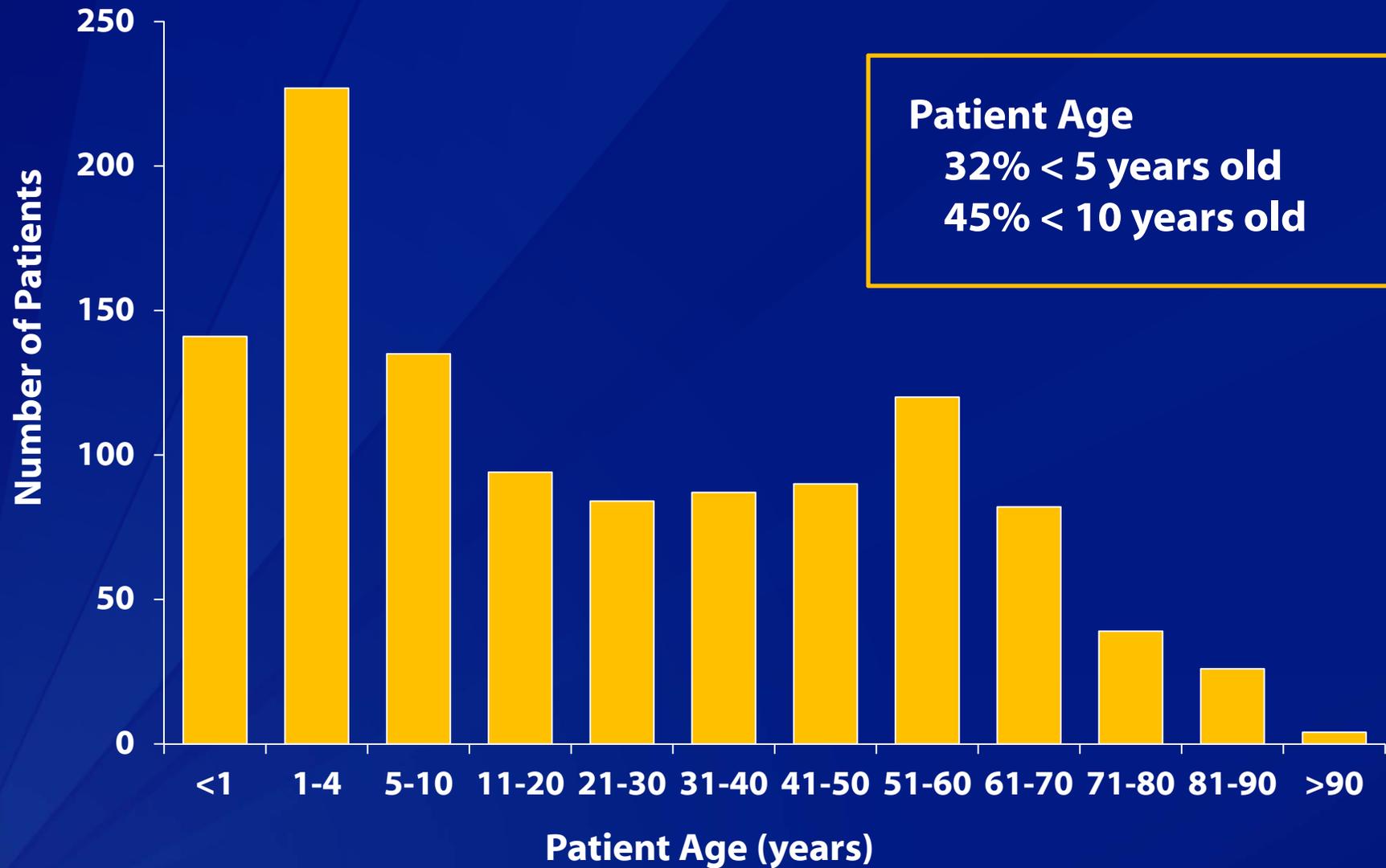
**(4–
356)**

**Median outbreak duration
(range)**

4.7 months

**(1–
12)**

Age Distribution of Persons with Poultry Associated Salmonellosis n=1,129



Live Poultry Exposure Type

Exposures	n=582
Adult poultry	117 (20%)
Baby poultry	373 (64%)
Chicks only	214 (57%)
Ducklings only	64 (17%)
Chicks and ducklings	83 (22%)

Baby Poultry Contact

n=373

Contact location

Home	277 (74%)
Other home	41 (11%)
Feed store	57 (15%)

Type of poultry contact

Touched	281 (75%)
Held/snuggled	183 (49%)
Kissed	52 (14%)

Baby Poultry Exposure at Home

Location of Chickens n=413

Indoors 188 (46%)

Indoor Location n=188

Living room 29 (15%)

Basement 23 (12%)

Kitchen 22 (12%)

Bedroom 18 (10%)

Bathroom 18 (10%)

Utility/Laundry Room 17 (9%)

Other Indoor 44 (23%)

Baby Poultry Exposure at Home

Location of Chickens **n=413**

Indoors **188 (46%)**

Indoor Location **n=188**

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Utility/Laundry Room **17 (9%)**

Other Indoor **44 (23%)**

***E. coli* on the Farm**

- ❑ **Outbreak of STEC O157:H7 in PA**
- ❑ **51 persons affected, mostly children, after visiting dairy farm**
- ❑ **8 (16%) persons developed HUS (kidney failure)**
- ❑ **Major risk factors:**
 - **Direct contact with animals**
 - **Inadequate hand-washing**
 - **Inadequate separation of eating and animal contact areas**
 - **Poor maintenance of hand-washing stations**



Hedgehogs

❑ Increasing in popularity

- Illegal in some states and cities
- Estimated in 40,000 households in 2007



❑ Outbreak Investigation

- 26 ill persons from 12 states
- 35% of patients were hospitalized
- 35% of ill persons were < 10 years of age
- 80% reported hedgehog exposure
- Positive animal and environmental samples



Turtle-associated *Salmonella*

1960-1970s

- Turtles were popular pets
 - 4% of households had at least 1 turtle
- 15 million turtles produced on farms each year
- Estimated 280,000 cases of *Salmonella* attributed to turtle exposure each year

1975

- Federal law enacted prohibiting sale of turtles < 4 inches
- Intended to prevent children from treating turtles as toys or putting them in their mouths





Turtlepocalypse - 2012



❑ CDC Investigation

- began investigating 8 separate *Salmonella* serotypes
- Patients from all 8 investigations reported turtle exposure
- Environmental sampling of turtles and turtle tank water were positive

❑ 473 ill person from 41 states

- 29% of ill persons were hospitalized
- 70% were < 10 years of age
- 31% were 1 year of age or less
- 44% of ill persons were Hispanic



Salmonella and Bearded Dragons

□ April 2014 Wisconsin contacted CDC

- 10 patients with a very rare serotype of *Salmonella*
- Majority of cases reported contact with bearded dragons

□ National Investigation

- 150 ill persons from 35 states
- 43% of ill persons were hospitalized
- 57% of ill persons were 5 years of age or younger



Tainted Pet Food

❑ Dry Dog Food

- 49 ill persons with *Salmonella* from 20 states
- High percentage of patients reported dog ownership
- Owners reported feeding different types of dry dog food
- Outbreak linked to multiple brands of dry dog food produced in a single facility



❑ Chicken Jerky Treats

- 21 people in New Hampshire ill with *Salmonella*
- From homemade dog chicken jerky treats



❑ Recent FDA study

- Random sampling of different types of pet foods
- 7% of raw pet foods tested positive for *Salmonella*
- 15% of raw pet foods tested positive for *Listeria monocytogenes*

Salmonella and Frozen Feeder Rodents

□ 2014

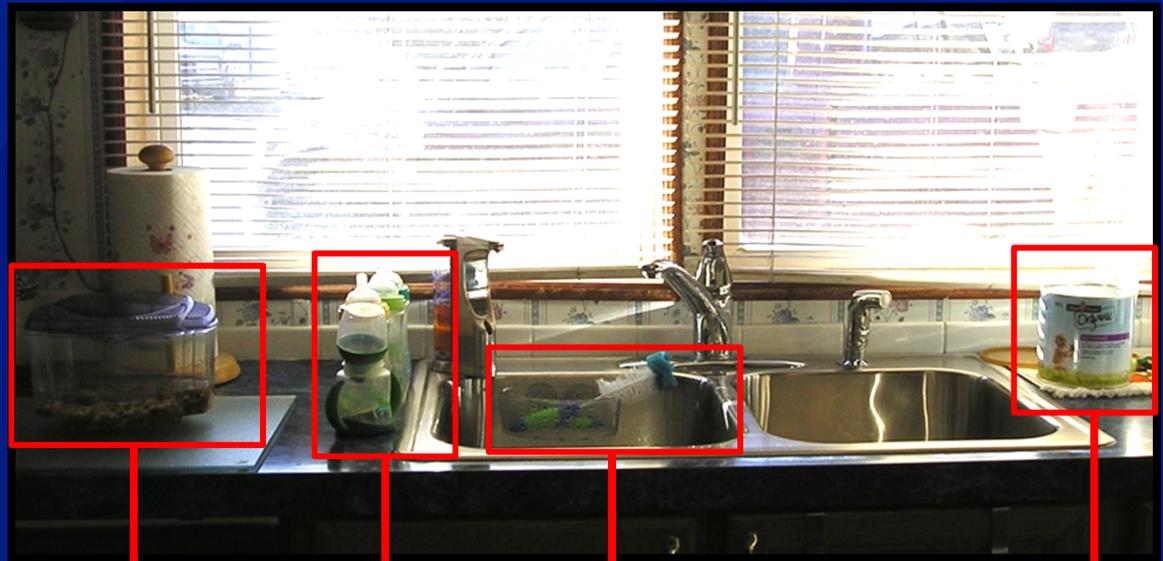
- 41 persons with outbreak strain of *Salmonella*
- High percentage reported reptile exposure
 - Specifically corn snakes
- Matching strain found both in reptiles and in frozen feeder rodents
- Frozen rodents sold as food item for snakes and some lizards



People do not have to directly touch an animal to catch a zoonotic disease.



Direct Contact



Aquarium

Baby Bottles

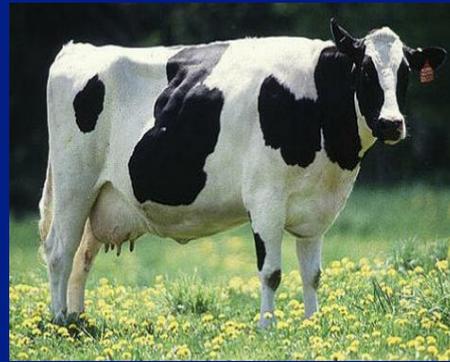
**Bottle
Brushes**

**Baby
Formula**

Indirect Contact

Contributing factors to the spread of zoonotic diseases

- ❑ **Animals carrying the most common zoonotic agents often show no clinical signs**
- ❑ **Animals shed organisms intermittently making detection difficult**
- ❑ **Treatment of animals may not reliably eliminate pathogens and can prolong shedding**
- ❑ **Stressed animals are more likely to shed organisms**



TREATMENT AND PREVENTION

Treatment of Enteric Zoonoses

- ❑ **Most episodes of enteric illness are self limited**
- ❑ **Intravenous therapy for severe dehydration**
- ❑ **Routine use of antidiarrheal agents not recommended**
- ❑ **Antimicrobial therapy, based on:**
 - Clinical signs/symptoms
 - Organism detected
 - Antimicrobial susceptibility testing
 - Appropriateness of antibiotic treatment

Recommendations for Patients

- ❑ **Wash your hands right after**
 - **Touching poultry, reptiles, small mammals or pet food**
 - **Contacting anything in the area where they live and roam**

- ❑ **Do not let the following groups handle poultry, reptiles or small mammals**
 - **Children younger than 5 years of age**
 - **Older adults**
 - **People with weak immune systems**

- ❑ **Do not let live poultry inside the house**



Prevention Resources

- ❑ Health Pets, Healthy People

<http://www.cdc.gov/healthypets/>

- ❑ CDC Enteric Zoonoses Educational Materials

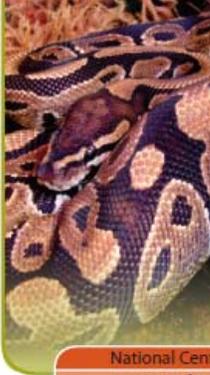
<http://www.cdc.gov/zoonotic/gi/education.html>

- ❑ One Health

<http://www.cdc.gov/onehealth/zoonotic-diseases.html>



After you touch amphibians or reptiles, wash your hands so you don't get sick!



- Contact with amphibians (such as frogs and toads) and reptiles (such as turtles, snakes, and lizards) can be a source of human *Salmonella* infections.
- Small turtles, with a shell length of less than 4 inches, are a well known source of human *Salmonella* infections, especially among young children. Because of this risk, the Food and Drug Administration has banned the sale of these turtles since 1975.
- Salmonella* germs can cause a diarrheal illness in people that can be mild, severe, or even life threatening.
- Amphibians and reptiles 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 these animals live.
- Reptiles and amphibians that live in tanks or aquariums can contaminate the water with germs, which can spread to people.

Protect Yourself and Your Family from Germs

Do:

- Wash your hands thoroughly with soap and water right after touching or feeding amphibians or reptiles, anything in the area where they live and roam, or water from their housing or habitats.
- Adults should supervise hand washing for young children.
- If soap and water are not readily available, use a hand sanitizer right away and then wash your hands thoroughly with soap and water as soon as you can.
- To prevent contamination, keep amphibians and reptiles out of kitchens and other areas where food and drink is prepared, served, or consumed.
- Tanks, feed or water containers, and any other equipment or materials used when raising or caring for amphibians and reptiles should be cleaned outside the house. Be aware that the equipment and materials, including the tank water, can be contaminated with *Salmonella* and other germs.

Don't:

- Don't let children younger than 5 years of age, older adults, or people with weak immune systems handle or touch amphibians or reptiles.
- Don't keep habitats containing amphibians or reptiles in a child's bedroom, especially children younger than 5 years of age.
- Don't let reptiles and amphibians roam free in your home.
- Don't bathe the animals or their habitats in your kitchen sink. If bathtubs are used for these purposes, they should be thoroughly cleaned afterward. Use bleach to disinfect a tub or other place where reptile or amphibian habitats are cleaned.

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

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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.



CS222453

Tips for Keeping People and Pets Healthy and Safe from Germs in Pet Food

Did you know that pet food, pet treats, and nutritional supplements for pets can become contaminated with harmful germs that can make people and pets sick? Pets that eat contaminated food can carry germs even if they appear healthy, and those germs can make you and your family sick.

One type of germ that can make both pets and people sick is *Salmonella*. These germs can cause diarrhea in people, which can be mild, severe, or even life-threatening. Children under 5 years old, elderly individuals, and people with weakened immune systems are especially at high risk for getting very sick from these germs.

SIMPLE STEPS TO PROTECT YOU, YOUR FAMILY, and YOUR PETS

- 1. WASH YOUR HANDS** with soap and water immediately after touching animals and their food, toys, waste, or areas where they sleep and play. This is especially important before touching your own food or preparing baby bottles.
- 2. KEEP YOUNG CHILDREN AWAY FROM PET FOOD** and pet feeding areas to reduce their chances for getting sick or injured.
- 3. BUY SAFE PET FOOD** with no visible signs of damage to the packaging.
- 4. AVOID FEEDING PETS RAW DIETS** or any other raw foods that have not been appropriately treated to eliminate disease-causing germs.
- 5. KEEP PET FOOD AWAY FROM "PEOPLE" FOOD.** Try not to store pet food or feed your pet in the kitchen or in any area where human food is stored or prepared.
- 6. REFRIGERATE UNUSED WET FOOD.**
To prevent germs from growing in wet pet food, promptly cover and refrigerate any unused wet pet food, and throw away leftover food that your pet did not eat during that meal.
- 7. WASH PET FOOD BOWLS AND UTENSILS REGULARLY.**
To prevent cross-contamination indoors, try to avoid washing them in kitchen or bathroom sinks or bathtubs.
- 8. CLEAN UP YOUR PET'S WASTE** and remember to wash your hands right afterwards. Pet's waste can contain germs. People at high risk for getting very sick from these germs should not clean up after pets.



For more information, call 1-800-CDC-INFO
or visit
<http://www.cdc.gov/Features/SalmonellaDryPetFood>

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Summary

- ❑ **Human and Animal interaction is very beneficial but people are often unaware of the potential risks**
- ❑ **Healthcare providers, veterinarians and public health officials have the unique opportunity to educate and share information to help people consider the risks and make educated decisions**



Questions?

For more information please contact Centers for Disease Control and Prevention

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.

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❑ Using the Webinar System

- “Click” the Q&A tab at the top left of the webinar tool bar
- “Click” in the white space
- “Type” your question
- “Click” ask

❑ On the Phone

- Press Star (*) 1 to enter in the queue to ask a question
- State your name
- Listen for the operator to call your name
- State your organization and then ask your question

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Continuing Education Credit/Contact Hours for COCA Calls/Webinars

Continuing Education guidelines require that the attendance of all who participate in COCA Conference Calls be properly documented. All Continuing Education credits/contact hours (CME, CNE, CEU, CECH, ACPE and AAVSB/RACE) for COCA Conference Calls/Webinars are issued online through the CDC Training & Continuing Education Online system <http://www.cdc.gov/TCEOnline/>.

Those who participate in the COCA Conference Calls and who wish to receive CE credit/contact hours and will complete the online evaluation by **August 18, 2014** will use the course code **WC2286(SC)**. Those who wish to receive CE credits/contact hours and will complete the online evaluation between **August 19, 2014** and **July 16, 2015** will use course code **WD2286(SC)**. CE certificates can be printed immediately upon completion of your online evaluation. A cumulative transcript of all CDC/ATSDR CE's obtained through the CDC Training & Continuing Education Online System will be maintained for each user.

Thank you for joining!
Please email us questions at coca@cdc.gov



**Centers for Disease Control and Prevention
Atlanta, Georgia**

<http://emergency.cdc.gov/coca>

Join Us on Facebook

CDC Facebook page for Health Partners! “Like” our page today to receive COCA updates, guidance, and situational awareness about preparing for and responding to public health emergencies.



The image shows a screenshot of the CDC Health Partners Outreach Facebook page. The page header includes the Facebook logo, a search bar, and the page name "CDC Health Partners Outreach" with "Home" and "Ads Manager" links. The main profile picture features a group of diverse healthcare professionals. Below the profile picture, the page name "CDC Health Partners Outreach" is displayed, along with "3,758 likes" and "105 talking about this · 68 were here". The "About" section identifies it as a "Government Organization" and provides a link to the CDC Emergency Risk Communication Branch. The "Highlights" section shows a post from "CDC Health Partners Outreach" shared a link via CDC, dated April 24. The post content includes "CDC Works For You 24/7 Blog - H7N9 Influenza: 6 Things You Should Know Now" and "CDC - Blogs - CDC Works For You 24/7 Blog - H7N9 Influenza: 6 Things You". The "Recent Posts by Others on CDC Health Partners Outreach" section shows several posts by "Art Leather" from "Cape Cod Artist Paints Chronic Pain" with timestamps from April 23. A "See Your Ad Here" section on the right shows an advertisement for the same CDC blog.

<http://www.facebook.com/CDCHealthPartnersOutreach>