Past, Present and Future of Salmonella Control in Poultry

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Minnesota Board of Animal Health

2018 USAHA Committee on One Health

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Outline Today

• Background, Current Issues

• **Past** programs of Test and Remove

• **Present** program of vaccines, testing and the role of NPIP

• **Future** challenges with live poultry production
Today’s News

• Salmonella
• Outbreak
• Public Reaction
Salmonella outbreak linked to recalled eggs expands with 38 sickened in 7 states

JBS Beef Link in 57 Salmonella Newport illnesses in 16 States
Food Poison Journal - Oct 3, 2018
Salmonella: Marler Clark, The Food Safety Law Firm, is the nation’s leading law firm representing victims of Salmonella outbreaks.
6.9 million pounds of beef are recalled for possible salmonella. Check ...
Vox - Oct 5, 2018
View all

What to know about Salmonella after recent outbreaks have made ...
ABC News - Oct 4, 2018
At least 57 people in 16 states have been reported with Salmonella infections after consuming some of the more than 6.5 million pounds of ...
Recent Salmonella outbreaks have made hundreds ill
Sand Hills Express - Oct 4, 2018
View all

Kellogg's Honey Smacks Salmonella Outbreak over after 135 Sickened
Food Poison Journal - Sep 28, 2018
The FDA, CDC, along with state and local officials investigated a multi-state outbreak of Salmonella Mbandaka infections linked to Kellogg's ...

Public urged to throw out raw milk from dairy implicated in Salmonella outbreak

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Drug-resistant salmonella from chicken sickens nearly 100

At least 92 people in 29 states have been infected with a strain of multidrug-resistant salmonella after coming into contact with a variety of raw chicken products, the U.S. Centers for Disease Control and Prevention said Wednesday. Twenty-one of the sick patients have been hospitalized, though no deaths have

Committee on Poultry and other Avian Species Reports

• **Egg Layers** – Food Safety, Foreign Animal Diseases, Areas of Concern
  - Salmonella Enteritidis (SE/FDA Egg Safety Rule Compliance) – 3.2/5 rating (moderate-high)
  - Group C or other non-SE serotypes resulting in egg recalls – 3.7/5 rating (moderate-high)

• **Broilers** - 2018 Major Non-Disease Issues
  - #2 – Increased Food Safety Regulations by USDA/FSIS
  - #3 – Biosecurity – Internal Programs, HPAI threat

• **Turkeys** – Turkey Health Survey
  - Salmonella 4/5 rating, #7/24 disease issues
  - Food Safety is #1 Research Priority
• USDA Bacteriologist (1850-1914)
• 2,500 antigenically distinct variants
  • Serovars or Serotypes
• Poultry – *Salmonella enterica*
  • Non-motile – host specific
    • *Salmonella* Pullorum, *Salmonella* Gallinarum
• Paratyphoid salmonellae
• *Salmonella* Arizonae (turkeys)
Salmonella Reservoirs, Control

• Many potential sources:
  • Breeder flock / hatchery
  • Environment
  • Feed
  • Rodents

• Control methods:
  • Source from clean flocks
  • Biosecurity
  • Cleaning & disinfection
  • Feed treatments
  • Rodent control
  • Vaccination
Disease Transmission

**EGG TRANSMITTED (vertical)**
- **Examples:**
  - Salmonella
  - Mycoplasma
- **Sources:**
  - Breeder Flock
  - Hatchery
  - People and equipment at these facilities

**MECHANICALLY TRANSMITTED (horizontal)**
- **Examples:**
  - Avian Influenza, Newcastle Disease
  - Salmonella
  - Mycoplasma
- **Sources:**
  - People
  - Equipment
  - Pests
Poultry Genetics, Pedigree Selection Pressure

Figure 8. Traditional Supply Strategy

Credit Aviagen Turkeys
Salmonella – The Past

1950's Clifford Smith with group of fellow poultry men meet in Columbia, MO for a course to learn how to test birds for Pullorum. Pullorum a wide-spread blood disease that caused high death loss to baby chicks.
Salmonella Pullorum (Pullorum Disease)
Salmonella Gallinarum (Fowl Typhoid)

• Important disease of US poultry in 1930’s

• Species Affected:
  • Chickens are the natural hosts
  • Found in other avian species

• Characteristics:
  • Asymptomatic adult carriers
  • High chick mortality
  • White diarrhea, depression, dehydration
Salmonella Pullorum-Typhoid Disease Cycle

- SP & SG - Serogroup D1
- Rapid Whole Blood Tests (Plate Test) in the Field
- OIE Reportable Disease
National Poultry Improvement Plan (NPIP)
National Poultry Improvement Plan (NPIP)

• U.S. Department of Agriculture
  • Plan coordination, Laboratory materials

• Official State Agency
  • (Minnesota Board of Animal Health)
  • Supervise program

• Industry participants
  • Voluntary
  • Must agree to meet standards

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PART 145—NATIONAL POULTRY IMPROVEMENT PLAN FOR BREEDING POULTRY

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Subpart C—Special Provisions for Multiplier Meat-Type Chicken Breeding Flocks and Products

§145.31 Definitions.
Salmonella – The Present
• During the 1980s, important cause of human illness
• Salmonella Enteritidis (SE) can be inside normal-appearing eggs
• Raw or lightly cooked (runny egg whites or yolks) eggs
### Egg-type Chicken breeding flocks with isolates of *Salmonella Enteritidis* by phage type and by year 1989-2018

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Egg Recall List UPDATE: 380 MILLION Eggs Recalled Over Salmonella

380 million eggs coming from Wright County Egg of Galt, Iowa have been recalled in several states over potential salmonella contamination, linked to seven reported cases of Salmonella in Minnesota, eight in Colorado, 266 in California, and many more in other states.
Salmonella in Meat Birds

Salmonella Surprise: 574 Sick In Foster Farms Outbreak, CDC Says
NBCNews.com - May 27, 2014
And Foster Farms officials have consistently refused to recall the meat ... the
Salmonella Heidelberg outbreak as well as the three Foster Farms ...
Tainted Foster Farms chicken still making people sick
KCRA Sacramento - May 28, 2014
View all

CDC-FSIS disclose Salmonella outbreak traced to raw turkey
by Dave Flynn on July 18, 2018
An outbreak of Salmonella Reading, caused by raw
turkey products has
sickened 90 people in 26
states and hospitalization
was already required in 44.4
percent of those cases, the
federal Centers for Disease
Control and Prevention
(CDC) in Atlanta announced
Thursday.

With the CDC announcement, the U.S. Department of Agriculture’s Food Safety and
Infection Service (FSIS) said it is continuing to work with its federal partners to
monitor a Salmonella Reading outbreak that may be associated with raw turkey
products.

To Reduce Salmonella Contamination in
Chicken, Target the Problem on Farms
Poultry companies can do more to combat this deadly bacterium

1/30/2019
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Salmonella in Baby Poultry

- Live poultry can be a source of Salmonella
- Salmonella germs can cause a diarrheal illness in people
- Mild, Severe, Life Threatening
- Chicks, ducklings, live poultry carry Salmonella and still appear healthy and clean
- Salmonella is shed in droppings and contaminates areas where birds live/roam

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 smuggle or kiss the birds, touch your mouth, or eat or drink around live poultry.

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Sample Collection for *Salmonella* testing

- **Environmental Samples:**
  - Pre-placement swabs
  - Bootie samples
  - Hatchery debris (fluff)
  - Chick/poult papers

- **Bird Cultures:**
  - Cloacal swabs
  - Dead-in-shells
  - Bird/tissues
Dr. Ben S. Pomeroy
University of Minnesota

Minnesota’s Turkey Industry

• University Research
• State Regulations
• Pro-Active Testing Programs
• Sharing of test information
• Primary Breeder Meetings
• Collaboration
Minnesota Turkey Industry Testing Programs
-Voluntary, Annual Renewal, OSA Supervision-

• Primary Breeders – Parent Stock
• Brooder Building Pre-Placement
• Environmental Tests
  • Beginning, Mid-Lay, End-of-Lay
• Hatchery Testing
• Chick/Poult Box Papers
• 10 Day Mortality

COOPERATIVE SALMONELLA REDUCTION PROGRAM


(December 1979)

2007 Cooperative Report
Salmonella – The Future, The Challenges
• Improved Tubed and Plated Media to assist enrichment process
  • Brilliant Green / Novobiocin
  • XLT4
  • MSRV
• NPIP Program Standards
Illustration 2: Culture procedures for house environmental samples, cloacal swabs, and hatchery samples
NPIP Approved Rapid Systems

Salmonella enterica
serovar Typhimurium T000240
Chromosome
4,954,814 bp
Biosecurity, Flock Sanitation, Hatchery Sanitation

-is it good enough?
Challenges to Salmonella Control

• Vertically integrated production systems may help with control strategies

• Confidentiality – testing, reporting, collaboration
  • Public vs. Private
  • Sharing of isolates, reporting without penalty

• Communication to the consuming public about what defines an “outbreak”

• How to deliver the message of overall food safety

• Over-extension of monitoring programs, regulations......serotypes matter
More Challenges

- **Salmonella** vaccination (live AND killed) reduce *Salmonella* in progeny
- Serotype shift so autogenous vaccines with yearly changes are needed
- Difficult to measure success...such as water acidifiers, probiotics, etc.
- Qualitative versus a quantitative load
- Not *Salmonella* elimination programs, *Salmonella* reduction programs
- Measuring success requires a lot of sampling......expensive
Take Home Message

• Salmonella
  • Ever changing, challenging situation
  • Evaluation of testing and sampling strategies
  • Evaluation of Control Strategies

• On-Going Discussion
  • More Communication
  • Testing, Surveillance, Reporting
  • Confidentiality, Data Use, Goals

None of Us Alone are as Good as All of Us Together

1/30/2019

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THANK YOU! THANK YOU! THANK YOU!