Food Safety and Inspection Service
Protecting Public Health and Preventing Foodborne Illness
FSIS Salmonella Update

Kristin G. Holt, DVM, MPH
FSIS Liaison to CDC
Atlanta, GA

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USAHA Subcommittee on Salmonella
Food Safety and Inspection Service: Mission in Action

We are the public health agency in the USDA responsible for ensuring that meat, poultry, and processed egg products are safe, wholesome, and accurately labeled.

Our Authority
Through a series of Acts, Congress empowers FSIS to inspect all meat, poultry, and processed egg products in interstate commerce.

- Federal Meat Inspection Act (FMIA), 1906
- Agricultural Marketing Act (AMA), 1946
- Poultry Products Inspection Act (PPIA), 1957
- Humane Methods of Slaughter Act (HMSA), 1958
- Egg Products Inspection Act (EPIA), 1970
Food Safety and Inspection Service: One Team, One Purpose

We work together to accomplish our mission of protecting public health.

More than 9,600 employees strong

- skilled
- diverse
- committed
- motivated
- highly trained
Food Safety and Inspection Service:
FSIS Field Services Laboratories

In Fiscal Year 2017, the FSIS laboratories performed over 4 million scientific analyses.

FSIS Office of Public Health Science
- Eastern Laboratory
  Athens, GA
- Midwestern Laboratory
  St. Louis, MO
- Western Laboratory
  Albany, CA
Food Safety and Inspection Service:

1980’s - Ready-to-eat (RTE) meat and poultry testing

- FSIS regulatory microbiological testing program for Ready-to-Eat (RTE) product began in 1983.
- RTE products are fully cooked and do not require further cooking by the consumer.
  - Cooked beef, roast beef, cooked corned beef
  - Deli and luncheon meats
  - Cooked poultry products
  - Cooked sausages
  - Fermented sausages
  - Jerky
  - Salads/spreads/pâtés
Sampling/testing

- Data are reported by *product category* through 2008
- Data are reported by *sampling project* since 2009
  - **RTEPROD_RAND** *Salmonella* sampling project
    - Samples are taken randomly at establishments
  - **RTEPROD_RISK**
    - Samples of post-lethality-exposed product, based on risk
- 325 grams of product is analyzed

Results

2015: 7/13,187 (0.05%) samples tested positive
2016: 14/13,977 (0.10%) samples tested positive
2017: 1/14,645 (0.01%) samples tested positive
**1990’s - Egg products testing**

**Sampling/testing**

- Pasteurized liquid, frozen, or dried egg products
  - Whole Eggs or Yolks, Whole Eggs with Added Yolks or Whole Egg Blends, Dried Yellow Egg Products, Egg Whites, Spray Dried Egg Whites, Pan Dried Egg Whites

- 1995 – Agricultural Marketing Service (AMS) transferred program responsibility to FSIS

- 100 grams of product is tested

**Results**

Table 2c. *Salmonella* in Pasteurized Egg Products Testing Program: Serotypes, CY 2008-2017

<table>
<thead>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Samples Tested</td>
<td>1,506</td>
<td>1,441</td>
<td>1,429</td>
<td>1,409</td>
<td>1,544</td>
<td>1,475</td>
<td>1,457</td>
<td>1,645</td>
<td>1,685</td>
<td>1,687</td>
<td>15,258</td>
</tr>
<tr>
<td>Total Samples Positive for <em>Salmonella</em></td>
<td>5</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>21</td>
</tr>
</tbody>
</table>
Food Safety and Inspection Service:

**FSIS Baseline Surveys**

- Initiated by FSIS in the early 1990’s to support the Pathogen Reduction (PR)/Hazard Analysis and Critical Control Point (HACCP) Systems - Final Rule

- Statistically-designed, microbiological surveys that sample a specific regulated carcass or product to
  - Estimate national prevalence of organism
  - Determine the percent positive levels of specific pathogens and indicator bacteria “on or in” product

- Traditional baselines surveys are performed over 12-15 months
Food Safety and Inspection Service:

Baseline Surveys

- Nationwide Young Chicken Microbiological Baseline Data Collection Program

- Nationwide Sponge Microbiological Baseline Data Collection Program: Goose

- Nationwide Sponge Microbiological Baseline Data Collection Program: Young Turkey

- Nationwide Sponge Microbiological Baseline Data Collection Program: Cattle

- Nationwide Sponge Microbiological Baseline Data Collection Program: Swine

- Nationwide Young Turkey Microbiological Baseline Data Collection Program

- Nationwide Pork Microbiological Baseline Data Collection Program: Market Hogs

- Nationwide Raw Ground Chicken Microbiological Survey
  - Report Mar-May, Sep-Nov 1995

- Nationwide Raw Ground Turkey Microbiological Survey
  - Report Jan-Mar, Sep-Nov 1995

- Nationwide Broiler Chicken Microbiological Baseline Data Collection Program

- Nationwide Beef Microbiological Baseline Data Collection Program: Cows and Bulls

- Nationwide Federal Plant Raw Ground Beef Microbiological Survey

- Nationwide Beef Microbiological Baseline Data Collection Program: Steers and Heifers
Food Safety and Inspection Service: Baseline Surveys

- Nationwide Raw Ground Turkey Microbiological Survey: Report Jan-Mar, Sep-Nov 1995

20% estimated *Salmonella* prevalence for broiler chickens
Pathogen Reduction (PR)/Hazard Analysis and Critical Control Point (HACCP) Systems - Final Rule

- Performance standards for raw meat and poultry
- *Salmonella* was selected
- Sampling sets: ~ 50 samples per set
  \[ X/50 = \text{the maximum number of positive samples acceptable in a set provides an 80\% probability of an establishment passing when it is operating at the standard} \]
- Performance standards could change
- HACCP Verification testing started 1998 – 2000
  – Establishment size (large, small, very small)
Example - Broiler carcasses

• Baseline prevalence 20% positive

• Aggregate results
  o 1998 - 2003 - 11.2% positive
  o 2004 - 13.5% positive
  o 2005 - 16.3% positive
"Salmonella Verification Sample Result Reporting: Agency Policy and use in Public Health Protection" - February 2006 Federal Register Notice

- Sampling scheduling based on risk-based criteria
  - Most samples positive
  - *Salmonella* serotypes most frequently associated with human salmonellosis

- Establishments are grouped into one of three categories.
  - Category 1 - Consistent process control
    - Two most recent Salmonella set results are equal to or less than 50% of the performance standard
  - Category 2 - Variable process control
    - At least one of their two most recent set results was greater than 50% of the performance standards or guidance without exceeding it, or they have passed their most recent set but failed the one prior to that one.
  - Category 3 - Highly variable process control.
    - Set exceeded the performance standard
Food Safety and Inspection Service:

**Baseline Surveys**

- Nationwide Beef and Veal Carcass Microbiological Baseline Survey
  - Beef/Veal Carcass Baseline Sampling Video
  - Study Design and Sampling Plan (Sep 2013) Addendum (Sep 2014)
  - More information about this survey

- Nationwide Raw Liquid Egg Products Baseline Survey
  - Report (Mar 2012 – Feb 2013)
  - Study Design and Sampling Frame for Technical Consultation (Mar 2012)

- Nationwide Microbiological Baseline Data Collection Program: Raw Chicken Parts Survey
  - Report (Jan 2012-Aug 2012)
  - Study Design and Sampling Frame for Technical Consultation (Jan 2012)

- Nationwide Microbiological Baseline Data Collection Program: Market Hogs Survey
  - Study Design for Technical Consultation (Oct 2011)

- Nationwide Microbiological Baseline Data Collection Program: Young Turkey Survey

- Nationwide Young Chicken Microbiological Baseline Data Collection Program
  - Young Chicken Baseline Data Collection Program

- Nationwide Microbiological Baseline Data Collection Program for the Raw Ground Beef Component: Domestic Beef Trimmings (Revised)

7.5% estimated *Salmonella* prevalence for broiler chickens
The Agency established a revised Performance Standard for *Salmonella* for young chicken and turkey carcasses as of July 1, 2011, in addition to initiating the Performance Standard for *Campylobacter* on young chicken and turkey carcasses.

### Results

#### Table A1

Percent Positive Salmonella Tests in the PR/HACCP Verification Testing Program

<table>
<thead>
<tr>
<th>Product</th>
<th>CY 2014 Baseline Prevalence (%)</th>
<th>Large</th>
<th>Small</th>
<th>Very Small</th>
<th>Unknown</th>
<th>All Sizes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td># Samp</td>
<td>% Pos</td>
<td># Samp</td>
<td>% Pos</td>
<td># Samp</td>
<td>% Pos</td>
</tr>
<tr>
<td>Young Chicken</td>
<td>7.5%</td>
<td>5,473</td>
<td>1.1%</td>
<td>2,414</td>
<td>4.5%</td>
<td>974</td>
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<tr>
<td>Ground Beef</td>
<td>7.5%</td>
<td>926</td>
<td>2.7%</td>
<td>4,951</td>
<td>1.6%</td>
<td>1,383</td>
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<tr>
<td>Turkeys</td>
<td>1.7%</td>
<td>882</td>
<td>1.3%</td>
<td>989</td>
<td>2.0%</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Product</th>
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<tr>
<td></td>
<td># Samp</td>
<td>% Pos</td>
<td># Samp</td>
<td>% Pos</td>
<td># Samp</td>
<td>% Pos</td>
</tr>
<tr>
<td>Young Chicken</td>
<td>7.5%</td>
<td>7,788</td>
<td>1.5%</td>
<td>2,372</td>
<td>6.5%</td>
<td>966</td>
</tr>
<tr>
<td>Steers/Heifers</td>
<td>1.0%</td>
<td>0</td>
<td>0</td>
<td>7</td>
<td>0.0%</td>
<td>0</td>
</tr>
<tr>
<td>Ground Beef</td>
<td>7.5%</td>
<td>2,080</td>
<td>2.9%</td>
<td>11,157</td>
<td>1.5%</td>
<td>3,924</td>
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<tr>
<td>Ground Chicken</td>
<td>44.6%</td>
<td>144</td>
<td>13.0%</td>
<td>290</td>
<td>19.0%</td>
<td>19</td>
</tr>
<tr>
<td>Ground Turkey</td>
<td>49.9%</td>
<td>55</td>
<td>5.5%</td>
<td>130</td>
<td>12.0%</td>
<td>32</td>
</tr>
<tr>
<td>Turkeys</td>
<td>1.7%</td>
<td>1,468</td>
<td>1.2%</td>
<td>914</td>
<td>3.8%</td>
<td>30</td>
</tr>
</tbody>
</table>
Category 1: Establishments that have achieved 50 percent or less of the Salmonella maximum allowable percent positive during all completed 52-week moving windows over the last 3 months.

Category 2: Establishments that meet the Salmonella maximum allowable percent positive for all completed 52-week moving windows but have results greater than 50 percent of the maximum allowable percent positive during any completed 52-week moving window over the last 3 months.

Category 3: Establishments that have exceeded the Salmonella maximum allowable percent positive during any completed 52-week moving window over the last 3 months.

Results
Food Safety and Inspection Service:

**Exploratory Sampling**

Nationwide Raw Pork Products Exploratory Sampling Project
- Intact pork cuts, other intact pork, non-intact pork cuts, other non-intact pork, and comminuted pork
- Phase I – May 2015
- Transition phase - January 2016
- Phase II - June 2017

Exploratory Other Raw Chicken Parts Sampling Project
- Hearts, whole or split gizzards, livers, necks, and quarter or half carcasses, including both those that are intact and those that are non-intact
- November 1, 2016
The World Health Organization (WHO) recommends that if on-farm sampling is not possible, samples from healthy animals at slaughter may be used to estimate bacterial resistance in food animals.

March 2013 - NARMS began the cecal sampling program—a collaborative effort between the FDA's Center for Veterinary Medicine (CVM) and FSIS.

Samples from cecal contents are collected at slaughter facilities of selected food animals and analyzed for *Salmonella*, *Campylobacter*, *Escherichia coli*, and *Enterococcus*.

The food animals that are sampled include young chickens, young turkeys, dairy cattle, beef cattle, market hogs, and sows.
NARMS - Cecal contents testing

Results

Figure 2. Percent cecal *Salmonella* isolates (n = 1,077 total isolates) pansusceptible, resistant, and MDR, within each production class, 2014.
Food Safety and Inspection Service:

**FSIS on-line resources**

- Sampling plans
- Sampling program data
- Establishment-specific data release strategic plan
- FSIS Microbiology Laboratory Guidebook (MLG)
  - *Salmonella* isolate characterizations - molecular serotyping, PFGE analysis, AST, whole genome sequencing and analysis
Food Safety and Inspection Service:

**FSIS Salmonella data**

Food Safety and Inspection Service:

Thank you!