KICK-STARTING FOODBORNE OUTBREAK INVESTIGATIONS WITH COMPLAINT AND ENVIRONMENTAL ACTIVITIES

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Salmonella enteritidis Outbreak

- 45 People in 12 states
- Two restaurant outbreaks identified in TN & AL
- FDA, CDC, ADH/A, TDH/A & MPH
- Complaint initiated
- Environmental assessment driven
The Big Picture

MULTISTATE OUTBREAK INVESTIGATION

- TN Department of Health
- ADPH (Alabama Department of Public Health)
- CDC
- FDA

Metro Public Health Dept
Protecting, Improving, and Sustaining Health
Epi curve by illness onset

- TN Cases
- TN & AL Environmental Assessments Initiated
- Egg Recall & Depopulation
Egg Distribution

- 20 total markets
- 47 total restaurants
- 1 egg producer
# Laboratory results

<table>
<thead>
<tr>
<th>Sample</th>
<th>Total</th>
<th>Total SE Positive</th>
<th>Type</th>
<th>WGS Linked</th>
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</thead>
<tbody>
<tr>
<td>Clinical stools</td>
<td>44</td>
<td>44</td>
<td>JEGX01.0021</td>
<td>YES</td>
</tr>
<tr>
<td>Farm Eggs</td>
<td>50 batches; 20 eggs per batch</td>
<td>13</td>
<td>JEGX01.0021</td>
<td>YES</td>
</tr>
<tr>
<td>Restaurant Eggs</td>
<td>17 eggs</td>
<td>0</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Restaurant Environmental Swabs</td>
<td>12</td>
<td>0</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Farm Environmental Drag Swabs</td>
<td>16</td>
<td>5</td>
<td>JEGX01.0021</td>
<td>YES</td>
</tr>
<tr>
<td>Chicken Feed</td>
<td>6</td>
<td>0</td>
<td>--</td>
<td>--</td>
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</tbody>
</table>
Public Health Impact

• Specific control measures at the restaurants and farm
• Recall of 650,000 eggs
• Public announcement
• Depopulation of 15K chickens
• Operations suspended until compliance with FDA Egg Rule
• Reduced impact to the public
### Isolated Complaint Management

#### Complaint Form

<table>
<thead>
<tr>
<th>Column</th>
<th>Information</th>
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</thead>
<tbody>
<tr>
<td>Reported location</td>
<td></td>
</tr>
<tr>
<td>Meal Date/Time</td>
<td></td>
</tr>
<tr>
<td>Foods Consumed</td>
<td></td>
</tr>
<tr>
<td>Contacts</td>
<td></td>
</tr>
<tr>
<td>Illness Onset</td>
<td></td>
</tr>
<tr>
<td>Symptoms/Duration</td>
<td></td>
</tr>
<tr>
<td>HCP Information</td>
<td></td>
</tr>
<tr>
<td>Meal History</td>
<td></td>
</tr>
<tr>
<td>Other Exposures</td>
<td></td>
</tr>
</tbody>
</table>
Using Meal History Data

Aug 9

Meal History

Date: Aug 4
Onset: 4 hrs

Meal History

Date: Aug 3
Onset: 18 hrs

Meal History

Date: Aug 2
Onset: 45 hrs

Meal History

Date: Aug 3
Onset: 20 hrs

Short Rib Gnocchi
Preliminary Information

- **Cases**: 6 people sick (1 hospitalization)
  - Clinical pathogen testing pending
- **Symptoms/Onsets**: Diarrhea, vomiting/18-22 hours
- **Exposure**: Single food establishment in Nashville
- **Exposure date**: August 3
- **Common food reported**: Short Rib Gnocchi
Environmental Assessment Planning

**Location:** Restaurant M
- Common date and time period
- Common meal

**Pathogen:** Enteric, bacterial
- Reported onsets & Severity of symptoms
- Common food reported

**Target foods:** Short Rib Gnocchi

**Contamination Source(s):** Beef, RTE ingredients, employees

**Target Practices:** Cook-kill, cooling, holding, cross-contamination

**Wild Cards:** Infected workers, unusual ingredients
Environmental Investigation

- Friday August 10 @ 4:00PM
- Environmental Assessment Goals
  - Identify Contributing Factors
  - Identify Environmental Antecedents
  - Implement control measures
  - Identify additional cases; collect relevant records and secure food samples
- Observation, recreation of events and employee interview
Short Rib Gnocchi Flow (from Interview)

- Understand the process and steps involved
  - What
  - When
  - Where
  - How
  - Who

- Contributing Factors
  - Contamination
  - Proliferation
  - Survival

- Important Notation:
  - Reported boiling of gnocchi
Beef Ribs

- Product is received fresh/unfrozen from US Foods Stockyard Division. Pre-cut ready-to-cook.
- Walk-in freezer
- Combine ingredients—oil, salt and pepper in cooking pot and immediately cook over stovetop (Par-cook step)
- Re-pan, add braising ingredients and cover with foil
- Cook in oven at 300F for 2-3 hours (Final cook-kill step)
- Separate beef and braising sauce; place in new pan
- Hot hold in cabinet warmer until service; leftovers discarded

- Sauce of Braising Ingredients
- Hot Hold 1
- Prep 12
- Serve
- Garnish
- Pickled Onions
- Gnocchi

Garnish
Pickled Onions
Gnocchi
Sauce of Braising Flow

Beef Rib
- Receive 1
- Storage 1
- Prep 1
- Cook 1
- Prep 2
- Cook 2
- Prep 3
- Cook 3
- Prep 4
- Cool 1
- Prep 5
- Hot Hold 1
- Sauce of Braising
- Receive 2
- Storage 2
- Prep 2
- Cook 2
- Prep 3
- Cook 3
- Prep 4
- Cool 1
- Prep 5
- Cold Hold 1
- Pickled Onion
- Receive 3
- Storage 3
- Prep 6
- Potato
- Flour, salt, nutmeg
- Receive 4
- Storage 4
- Prep 7
- Cook 4
- Cool 2
- Prep 9
- Gnocchi
- Receive 6
- Storage 6
- Prep 8
- Hold
- Eggs
- Receive 5
- Storage 5
- Prep 10
- Storage 8
- Storage 9
- Serve
- Prep 11
- Cook 5
- Prep 12
- Garnish
- Receive 7
- Storage 7
- Prep 10
- Storage 9
Braising Sauce

Dry and refrigeration storage
Portion and combine ingredients
Seared on stovetop for 15 minutes
Shallow pan in walk-in cooler
Pour into quart bottles
Line cooler and top of line well
Pan sear on cook line to order

Gnocchi

Beef Ribs

Prep 11
Cook 5
Prep 12
Serve

Beef Ribs

Prep 3
Cook 3

Prep 4

Prep 2
Cook 2

Storage 2

Prep 5

Cool 1
Cold hold 1

Receive 2

Pickled Onions

MetroPublicHealthDept
Nashville/Davidson County
Protecting, Improving, and Sustaining Health
Gnocchi (based on interview)

**Potato**
- Fresh/Unprocessed
- Dry Storage
- Peel/Containerize
- Boil over stovetop
- Sheet tray + walk-in

**Flour, Salt, Nutmeg**
- Receive 4
- Storage 4
- Cook 4
- Cool 2

**Eggs**
- Receive 5
- Storage 5

*Boil reported during manager interview*
- Combine Ingredients
- Pan sear stovetop

Combine ingredients, roll into logs, cut, place on sheet tray
- Storage 8
- Walk-in Freezer
- Prep 10
- Portion, weigh, bag

Walk-in Freezer & line freezer
- Prep 12
- Cook *

Serve

- Prep 12
- Cook 5
- Prep 10
- Storage 9

Fresh, in-shell, Farm X
- Walk-in cooler
Gnocchi (based on observation)

**Potato**
- Fresh/Unprocessed: Receive 4
- Dry Storage: Storage 4
- Peel/Containerize: Prep 7
- Boil over stovetop: Cook 4
- Sheet tray + walk-in: Cool 2

**Flour, Salt, Nutmeg**
- Receive 4
- Storage 5

**Eggs**
- Receive 5
- Storage 5
- Fresh, in-shell, Farm X
- Walk-in cooler

**Preparation**
- Combine ingredients, roll into logs, cut, place on sheet tray

**Cook**
- Prep 11
- Cook 5
- Prep 12
- Serve

*Boil reported during manager interview

**Combine Ingredients**
- Portion, weigh, bag
- Walk-in Freezer
- Walk-in Freezer & line freezer

**Product cooked to 130°F to 150°F during reconstruction evaluation**

**Notes**
- Boil during reconstruction evaluation
- **Cook 5**
What Was Learned?

Contributing Factors
- Suspect food contained raw egg as an ingredient
- Undercooked raw eggs allowed the survival of pathogen (Survival Factor)
- Eggs were likely contamination at the source (Contamination Factor)

Environmental Antecedents
- Untrained staff
- Lack of management oversight
- Equipment capacity for high volume

Control Measures
- Immediate food embargo
- Situational awareness: enhanced training, improved management oversight
- Process changes: Remove product from service, ingredient substitutions
Sampling and NEARS Data Collection

- **Food Samples**
  - Hold placed on 1 case of eggs on August 10
  - All but 17 eggs were discarded
  - Gnocchi from suspect batch unavailable

- **Environmental Samples**
  - 12 environmental swabs were collected on August 13
  - Gnocchi production area and cook line

- Remaining NEARS data collected on August 13
Investigation Strengths and Limitations

**ENVIRONMENTAL ASSESSMENTS**
- CF identification: Strong
- Rapid response: Strong
- Sample procurement: Moderate

**EPIDEMIOLOGIC STUDIES**
- Food implicated: Strong
- Firm implicated: Moderate
- Limited data: Moderate

**LABORATORY ANALYSIS**
- Clinical, food & ENV samples: Very Strong
- WGS linked: Very Strong

**PUBLIC HEALTH IMPACT**
- Timely control measures: Very Strong
- Product recall: Very Strong
- Public awareness: Very Strong
Complaint System and Environmental Impact Summary

- Complaint System
- Food history capture
- Cluster Identification

Common Exposure/food Identification

ID Contributing Factors & Control Measures
- Rapid response
- Food Flow
- Reconstruct Events
- Employee Interviews

Practice
- Vehicle
- Agent
- Source/Farm Implication
- Pieces of puzzle

FDA & ADAI Participation

Local & National Controls
- Illegal Egg Producer Identified
- Egg Recall & Hen Depopulation
- Education & Training

MetroPublicHealthDept
Nashville/Davidson County
Protecting, Improving, and Sustaining Health
Acknowledgments

- Nashville-Metro Public Health Department
- Tennessee Department of Health
- Tennessee Department of Agriculture
- Tennessee Department of Health State Laboratory
- Alabama Department of Agriculture
- Alabama Department of Public Health
- Food and Drug Administration
- Centers for Disease Control and Prevention
THANK YOU

Questions?