Outbreak of Multidrug Resistant *Salmonella* I 4,[5], 12:i:- Infections Linked to Pork — Washington State, 2015

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**Salmonella**

- Most common bacterial cause of foodborne illness in the United States
  - 1 million illnesses
  - 400 deaths

- Serotype I 4,[5], 12:i:-
  - 5th most frequently reported *Salmonella* serotype in the United States

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**Count of *Salmonella* I 4,[5], 12:i:- PulseNet Isolates by Year—United States, January 2009–Present**

- Chart showing isolate count by year from January 2009 to July 2015.
Outbreak Detection: June and July 2015

- Public Health–Seattle & King County (PHSKC) and Washington State Department of Health (WADOH)
  - 61 *Salmonella* I 4,[5], 12:i:- infections
  - Indistinguishable pulsed-field gel electrophoresis (PFGE) patterns
  - 8 counties

- Marked increase above baseline in Washington State

- Multiple subclusters with pork exposure
  - Pig roasts (n=14)
  - Asian restaurants (n=3)
  - Ethiopian (kitfo) (n=2)
  - Live pig exposures (n=3)
Initial Case Definition

- *Salmonella* I 4,[5], 12:i:- infection with isolate matching one of the following PFGE *XbaI* patterns in a WA State resident
  - JPXX01.1314
  - JPXX01.2311
  - JPXX01.2429
  - JPXX01.3161
  - JPXX01.3336

- OR *Salmonella* I 4,[5], 12:i:- infection with isolate matching one of the outbreak PFGE patterns with highly related whole genome sequencing (WGS) in a resident of another state

- And Illness onset between April 25, 2015–September 25, 2015
Pork Exposures, as of October 21, 2015

Of 93 cases with known pork exposure, 62 (67%) currently traceback to one USDA-FSIS inspected swine slaughter establishment in Washington State (Establishment A)

<table>
<thead>
<tr>
<th>Exposure</th>
<th>n</th>
<th>%</th>
<th>FoodNet %*</th>
<th>p-value</th>
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<tbody>
<tr>
<td>Any pork (n = 93)</td>
<td>121</td>
<td>77%</td>
<td>43%</td>
<td>&lt;0.001</td>
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<td>Pork traceback to Establishment A (n = 62)</td>
<td>93</td>
<td>67%</td>
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Traceback Investigation
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### Food and Environmental Testing Results

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- *Salmonella* Infantis (JFX001.0046) isolated at Establishment A and added to case definition
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- *Salmonella* Infantis (JFX001.0046) isolated at Establishment A and added to case definition
Persons infected with outbreak strains of *Salmonella* I 4,[5], 12:i:- and Infantis, as of October 21, 2015, by date of illness onset, (n=191)*

*Some illness onset dates have been estimated from other reported information.*
Persons infected with the outbreak strains of *Salmonella* I4,[5],12:i-, by state of residence, as of October 21, 2015 (n=191)
Patient Characteristics

- Median age = 35 years (range: <1 to 90 years)
- 50% (96/191) female
- 17% (31/180) hospitalized
- No deaths
Antimicrobial Susceptibility Testing (AST)

- 10 clinical isolates submitted to CDC National Antimicrobial Resistance Monitoring System (NARMS)
  - All ten (100%) exhibited **ASSuT** resistant profile
  - Designates resistance to the following antimicrobials:
    - Ampicillin
    - Streptomycin
    - Sulfisoxazole
    - Tetracycline

Highly important (WHO 2012)
Critically important (WHO 2012)
Whole Genome Sequencing Results for *Salmonella* I 4,5,12:i:-

**Primary Clade:**
- Human isolates from restaurant and pig roast attendees (WA, OR, CA, AK)
- WA and FSIS slaughter establishment isolates

**Secondary Clade:**
- Human isolates from pig roast attendees

Isolates from attendees of a single pig roast were found in both clades.
Conclusions

- Largest recorded *Salmonella* outbreak in Washington State
- Recommend interventions tailored for multiple points in “farm to fork” chain
- Pork: *Increasingly* suspect food vehicle for human salmonellosis
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The findings and conclusions in this presentation are those of the author and do not necessarily represent the views of CDC or PHSKC.
Thank you!