Salmonella Typhimurium Outbreak Linked to Restaurant Salad Dressing

8th Annual OutbreakNet Meeting
August 29th, 2012
80-100 cases of salmonellosis are reported in Vermont each year

- 2010 Incidence = 12.9 cases/100,000
- 2010 Food Net Average = 17.6 cases/100,000

Most common serotypes: Enteritidis & Typhimurium

Few Salmonella PFGE clusters involving 2 or more Vermonters, fewer exclusively in state
Initial Signs of Outbreak

- October 5, 2011
  - VDH Lab notified epi of a cluster of three matching *Salmonella* Typhimurium isolates
    - Comprised only of Vermont residents
    - Cluster: 1110VTJPX-1
    - XbaI Pattern: JPXX01.3014
      - New to both Vermont and PulseNet databases
  - Standard *Salmonella* interviews found:
    - Onsets were within 3 days of each other
    - No common exposures

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Initial Outbreak Investigation

- **October 12th**
  - Two additional PFGE matches identified
    - One adult, one newborn baby
    - Stool sample collected from mom of newborn

- **October 13th**
  - Mom tests positive for *S. Typhimurium*
    - PFGE match to cluster on October 17th
    - 5 cases have completed shotgun interviews
      - 3/5 report: crab rangoon, cream cheese, eggs
      - 4/5 report: bananas, block cheese
      - 5/5 report: bagels, local restaurant X
Case Characteristics

- Total of 6 primary cases identified
  - Newborn treated as secondary case
    - Presumed transmission during water birth
    - Only hospitalized case (5 days in NICU)

- Age
  - 5 adults (average age = 32; range = 20-41)
  - 1 child (<10 years)

- Gender
  - 4 females, 2 males
Formal Investigation Begins

- October 14th
  - VDH Food & Lodging inspects Restaurant X
    - Passed inspection (score = 84/100)
      - 70 or greater needed to pass
    - Employee questionnaires given to management for distribution to all employees
      - Mid-September work schedule & tasks
      - Recent illness
      - Employment at other local food establishments
  - Case-control study #1 launched
Case Control Study #1

- **Purpose**
  - Identify the responsible food item or dining location

- **Design**
  - Interview cases & controls about food items common among shotgun results
  - **Goal:** Interview 3 “well” friend controls per case
    - Failed to get the number of controls necessary
  - **Actual:** Interview 3 “well” VDH staff per case
    - Matched on sex, age group, county of residence
## Case Control Study #1 Results

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<th>Exposure</th>
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<th>95% Confidence Interval</th>
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<tbody>
<tr>
<td>Asian Restaurants</td>
<td>9.00</td>
<td>0.87 - 92.76</td>
<td>3</td>
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<tr>
<td>Bagel Shops</td>
<td>75.00</td>
<td>2.56 - 2196.45</td>
<td>4</td>
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<td>Bagels</td>
<td>30.56</td>
<td>1.39 - 670.90</td>
<td>5</td>
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<tr>
<td>Bananas</td>
<td>3.52</td>
<td>0.16 - 79.63</td>
<td>4</td>
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<tr>
<td>Block Cheese</td>
<td>9.00</td>
<td>0.41 - 198.21</td>
<td>4</td>
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<td>Crab Rangoon</td>
<td>22.50</td>
<td>1.51 - 335.34</td>
<td>3</td>
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<tr>
<td>Cream Cheese</td>
<td>3.89</td>
<td>0.55 - 27.28</td>
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<td>Eggs</td>
<td>5.53</td>
<td>0.25 - 124.40</td>
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<tr>
<td>Restaurant X</td>
<td>363.00</td>
<td>6.41 - 20656.48</td>
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- Five cases ate at four different bagel shops
- No shared food items or employees between bagel shops

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Case Control Study #2

- Purpose
  - Identify the responsible food item at Restaurant X

- Design
  - Use reservation list from Restaurant X to identify diners on same dates as cases (Sept. 15\textsuperscript{th}-17\textsuperscript{th})
  - Interview cases & controls about food items consumed

- Problems
  - Restaurant demanded changes to questionnaire before releasing reservation list
  - 10 days elapsed before delivery of reservation list

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Case Control Study #2 - Controls

- From Sept. 15\textsuperscript{th}-17\textsuperscript{th} reservation list:
  - 1732 diners across 567 parties
  - Contact info provided for 147 parties (689 diners)
  - Reached 71 diners
    - 52 “well” diners were used as controls for the study
    - 19 diners were excluded from the study
      - Poor meal recall (3)
      - Incorrect dining date (1)
      - Refusal to provide demographic info (1)
      - Self-reported GI illness following meal (9)
      - Interviewer mistakes (7)
Case Control Study #2

- Three questionnaires were deployed on Oct. 26\textsuperscript{th}
  - Restaurant X contains sub-restaurant w/ shared kitchen & salad bar
  - Cases dined at both restaurants, lunch & dinner
    1. Restaurant X Lunch menu (118 food items)
    2. Restaurant X Dinner menu (130 food items)
    3. Restaurant $X^U$ – One menu (122 food items)

- Started Oct. 26\textsuperscript{th}, completed Nov. 2\textsuperscript{nd}

- Double-data entry, data reconciliation, analysis using SAS

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<td>2.84</td>
<td>0.15 - 54.83</td>
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<tr>
<td>Lettuce</td>
<td>3.60</td>
<td>0.19 - 68.80</td>
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<tr>
<td>Broccoli</td>
<td>1.38</td>
<td>0.21 - 9.14</td>
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<td>Cucumbers</td>
<td>4.23</td>
<td>0.46 - 40.00</td>
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<td>Carrots</td>
<td>5.43</td>
<td>0.59 - 50.06</td>
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<td>Beets</td>
<td>1.58</td>
<td>0.26 - 9.75</td>
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<td>Scallions</td>
<td>2.36</td>
<td>0.35 - 15.97</td>
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<td>Olives</td>
<td>3.55</td>
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<td>Bacon Bits</td>
<td>8.16</td>
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<td>14.42</td>
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Conclusions

- **Employee Questionnaires**
  - No evidence of employee illness from questionnaires
    - Requested questionnaires from all employees
    - Received only from 61% of staff
      - All kitchen staff completed questionnaire
    - Took 26 days for questionnaires to be returned

- **Case Control Study #1**
  - Illness was statistically associated with dining at Restaurant X
  - No common threads among bagels/bagel shops
  - Case #6 did not report bagel exposure
Conclusions Continued

- **Case Control Study #2**
  - Illnesses were statistically associated with consumption of house made dill salad dressing

- **Food & Lodging Inspection**
  - No food samples collected for testing
    - ~1 month elapsed between exposures & inspection
  - One batch of dill dressing (~5 gallons) lasts 3 days at restaurant
    - Cases were exposed over 3 days (Sept. 15\textsuperscript{th} – 17\textsuperscript{th})
  - Dressing was improperly dispensed from its storage container

Vermont Department of Health
Improper Dispensing – Contamination?
Wrap Up

- PFGE pattern (JPXX01.3014) has not been seen since outbreak
- Cases reported unusually long incubation periods
Acknowledgements

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- Jeffrey Heath
- Patricia Hennard
- Norleen Jones
- Dorey Meyers
- Heather Simkins
- Sara Moran

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- Keeley Weening

**Legal**
- Margaret Vincent
- Bessie Weiss

**Administration**
- Charon Goldwyn
- Ashley Goodrich

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- Linda Bloschies

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- Brant Goode

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