Investigating a Deadly Foodborne Outbreak in an Residential Facility for the Mentally Retarded

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Background
Methods – Epidemiology

- **Case Definition** - “Facility resident or employee with onset of unexpected* diarrhea on November 2 or 3, 2004.”

- **Active Case Finding** - Email to staff to report GI illnesses between 11/2 and 11/5/04
  - Stool samples to be collected on all ill patients

* Unexpected diarrhea is defined as not attributable to medication, dietary or other conditions
Methods - Epi

- **Cohort Study**
- Eight CHD staff conducted Proxy interviews
- Menus medical/activity records were used for food & symptom histories
- Some kitchen staff were interviewed
Methods – Laboratory

- 7 stools samples submitted to Va state lab for viral & bacterial:
  - **Bacterial Testing**
    - *Yersinia, C. perfringens, Salmonella, Shigella, Campylobacter, Staphylococcus aureus-enterotoxin, Ecoli O157:H7, Bacillus cereus, Vibrio, Shiga Toxins*
  - **Norovirus**
  - **Gastric Content of deceased**
  - **Frozen BBQ sauce & Shredded Pork with sauce**
Methods- Environmental Health

- Kitchen Inspection
- Interviews with Kitchen staff
- Food flow analysis
- Two affected cottages and common use areas were assessed
## Results - Epi

<table>
<thead>
<tr>
<th>Pork BBQ</th>
<th>Ill</th>
<th>Not Ill</th>
<th>Total lx</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes (exposed)</td>
<td>30</td>
<td>28</td>
<td>58</td>
</tr>
<tr>
<td>No (not exposed)</td>
<td>1</td>
<td>11</td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
<td>31</td>
<td>39</td>
<td>70</td>
</tr>
</tbody>
</table>

AR = 51.7; RR = 6.2069; p = 0.000587

![Frequency of Incubation Period](image)
Campus Map

Cluster 1: 29%
Cluster 2: 19%
Cluster 3: 52%
Cluster 4
Cluster 5

Administration
Kitchen
Building 29
Building 30
Results – Epi Investigation

Attack Rate by Estimated Time of Consumption

Estimated Time BBQ was eaten

- Cluster 5
- Cluster 4
- Cluster 28
- Cluster 1
- Cluster 3 a,c,d
- Cluster 2
- Cottage 3b

Estimated time BBQ serving pans are switched
## Results - Laboratory

<table>
<thead>
<tr>
<th>Direct Stool</th>
<th>Toxin</th>
<th>Colonies per gram</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resident A</td>
<td>Positive</td>
<td>140,000,000</td>
</tr>
<tr>
<td>Resident B</td>
<td>Positive</td>
<td>1,500,000</td>
</tr>
<tr>
<td>Resident C</td>
<td>Positive</td>
<td>2,000,000</td>
</tr>
<tr>
<td>Resident D</td>
<td>Positive</td>
<td>130,000</td>
</tr>
<tr>
<td>Resident E</td>
<td>Positive</td>
<td>2,700,000</td>
</tr>
<tr>
<td>Resident F</td>
<td>Negative</td>
<td>Not Done</td>
</tr>
<tr>
<td>Resident G</td>
<td>Positive</td>
<td>2,100,000</td>
</tr>
</tbody>
</table>

Frozen BBQ Sauce and BBQ with Sauce tested negative for *C. perfringens*
Results - Environmental

- One delivery trip takes about 15 minutes.
- Not all meals are consumed immediately upon arrival.
Results - Environmental

- 2 to 3 day process
- Communication between Shifts
- No time and temperature monitoring
- Shortage of staff
- Management delivered food
- Serving trays did not maintain temp.
Discussion

- *Clostridium perfringens* implicated
  - Food prep management
  - Meal Delivery
  - Type of food served
- *C. perfringens* is a common food borne illness
- Death from *C. perfringens* is rare
- Challenges to overcome with food prep and delivery
Recommendations

- Assess the number of kitchen staff
- Improve communications with cottages
- Rethermalization units in cottages
- Reduce the processing steps
- Prepare foods same day as consumed
- Fill the serving trays just before delivery
- Monitor time and temperature, incorporate HACCP.
Recommendations

- Use covered trailer
- CFM monitor in the cottage kitchens.
- All cottage staff receive food handling training
- Rethermalization units in cottages
Outcome

- **Food Service CQI Teams**
  - 2 new enclosed trailers
  - New product vendors
  - Rethermalizing Units
  - Staff Training

- **Quality Assurance Indicators**
  - HACCP implemented
  - Ongoing CQI reviews
Questions?

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