CDC’s National Environmental Assessment Reporting System (NEARS): Informing Foodborne Illness Outbreak Investigation and Prevention

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The findings and conclusions in this report are those of the authors and do not necessarily represent the views of CDC or the Agency for Toxic Substances and Disease Registry.

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Host-agent-environment model of disease transmission
Location of U.S. outbreaks

61% restaurants
Environmental health outbreak investigation activities

- Interviewing kitchen managers and food workers
- Observing how restaurants prepare food (for example, food temperatures)
- Reviewing or collecting records (for example, records of food cooking temperatures, traceback records)
- Sampling for pathogens in the restaurant kitchen
Outbreak contributing factors

Contamination

Proliferation

Survival
50% of outbreaks have identified contributing factor.
Outbreak environmental antecedents

- People
- Processes
- Equipment
- Food
- Economics

Contributing factors
Outbreak example

Restaurant A

Dinner rolls

36 cases of *Salmonella* Enteritidis
Outbreak example

Same set of brushes

Raw chicken

Cooked rolls
Illness/outbreak prevention
National Environmental Assessment Reporting System (NEARS)
NEARS 2014-2016 data

- Outbreak characteristics
- Outbreak establishment characteristics
- Outbreak investigation characteristics
NEARS outbreaks

- 212 confirmed outbreaks
- 93 unknown agent outbreaks
- 99 suspected outbreaks
NEARS outbreaks

- Norovirus: 61%
- Salmonella: 16%
- Clostridium perfringens: 6%
Contributing factors to NEARS outbreaks

- Bare-hand contact by infectious food handler: 28%
- Other mode of contamination by infectious food handler: 23%
- Glove-hand contact by infectious food handler: 16%
- Cross-contamination of ingredients: 11%
- Insufficient time or temperature during cooking: 11%
NEARS outbreak establishments

- 73% independently owned
- 87% complex food preparation
- 55% serve <200 meals daily
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<thead>
<tr>
<th>No policy</th>
<th>Non-written policy</th>
<th>Written policy</th>
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<tbody>
<tr>
<td>14%</td>
<td>39%</td>
<td>47%</td>
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**Policy to restrict or exclude ill workers**

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<tr>
<th>No policy</th>
<th>Non-written policy</th>
<th>Written policy</th>
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<td>8%</td>
<td>36%</td>
<td>56%</td>
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**Policy for workers to tell managers when they are ill**
Policy requiring disposable glove use

- 62% Non-written policy
- 28% Written policy
- 10% No policy
NEARS outbreak investigations

- 25% 2 visits
- 50% 1 visit
- 25% >2 visits

- 23% 1-2 days
- 8% >3 days
- 69% Same day
Recap

NEARS collects data from the environmental health component of outbreak investigations to:

✓ Emphasize environmental causes of outbreaks
✓ Target prevention efforts

These data can be analyzed to identify and understand:

• Establishment types vulnerable to outbreaks
• Contributing factors to outbreaks
• Gaps in establishment policies and practices
• Gaps in investigation practices
Future research

- What restaurant characteristics are associated with outbreak occurrence?
  - Compare outbreak to non-outbreak restaurants
- What restaurant characteristics are associated with outbreak size?
  - Compare small to large outbreaks
- What restaurant characteristics are associated with outbreak type (bacterial vs. viral)?
  - Compare bacterial to viral outbreaks
NEARS

- General info: www.cdc.gov/nceh/nears/index.htm
- Recent pub: www.cdc.gov/nceh/ehs/nears/publications.htm

CDC’s Environmental Assessment Training

Thank you

For more information, contact NCEH
1-800-CDC-INFO (232-4636)
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