NEARS: Informing Foodborne Illness Outbreak Investigation and Prevention

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Presentation overview

- Division of Emergency and Environmental Health Services (DEEHS) objectives
- Environmental factors contributing to foodborne illness outbreaks
- Outbreak environmental assessments
- Environmental assessment training
- National Environmental Assessment Reporting System (NEARS)
DEEHS Objectives

- Improve identification and reporting of environmental factors contributing to foodborne illness outbreaks
- Support of environmental assessments at the state and local level
- Collection and analysis of environmental assessment data at the national level
- Inform and improve outbreak investigation, prevention, and intervention
Environmental factors contributing to outbreaks

Environmental factors include

Contributing factors - The "How"

Environmental antecedents - The "Why"
Environmental factors contributing to outbreaks

Environmental antecedents (Why)

- Worker in a hurry
- Worker had not been trained on avoiding cross contamination

Contributing factor (How)

- Cross contamination
  - Worker used same utensils on raw ground beef and salads

Outbreak

- *E. coli* outbreak caused by salads eaten at Restaurant A
## Environmental factors contributing to outbreaks

<table>
<thead>
<tr>
<th>Contributing factors</th>
<th>Contamination</th>
<th>Proliferation</th>
<th>Survival</th>
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</table>
| **Contamination**    | • Cross-contamination of ingredients  
                     | • Contact by an infectious/ill worker | • Improper cold holding due to malfunctioning equipment  
                     |                                         | • Improper cold holding due to improper procedure | • Insufficient time/temp during reheating  
                     |                                         |                                         | • Insufficient time/temp during freezing |

### Environmental Antecedents

- People
- Processes
- Equipment
- Economics
- Food
Outbreak environmental assessments

Environmental health component of foodborne illness outbreak investigations

Goal is to thoroughly describe the environment in which the outbreak occurred, and identify outbreak environmental factors

Involve a thorough review of the processes and practices used with suspected food items

May also include staff interviews, observations of food preparation, sampling

Are guided by known information about the outbreak

Generate recommendations for intervention
SUPPORT OF ENVIRONMENTAL ASSESSMENTS AT THE STATE AND LOCAL LEVEL

Training
Environmental assessment training

- Designed to improve environmental health programs’ competency in conducting environmental assessments during outbreaks
- 5,100 people from over 1,200 federal, state, local government agencies have registered for the training
- Free, web-based, interactive
- Participants show a 25 percentage point increase in pre to post test scores
Environmental assessment training

- Lesson 1: Your Assignment
- Lesson 2: Overview of Foodborne Illness Outbreak Environmental Assessments
- Lesson 3: Effective Interviewing Skills
- Lesson 4: Observation and Records Review
- Lesson 5: Environmental Sampling
- Lesson 6: Critical Thinking Skills
- Lesson 7: Organizing Assessment Information
- Lesson 8: Control Strategies
COLLECTION AND ANALYSIS OF ENVIRONMENTAL ASSESSMENT DATA AT THE NATIONAL LEVEL

National Environmental Assessment Reporting System (NEARS)
National Environmental Assessment Reporting System (NEARS)

- Launched in 2014
- State and local programs report data to NEARS from their outbreak environmental assessments
  - Contributing factors
  - Outbreak establishment policies and practices
  - Investigation characteristics
- 27 jurisdictions registered to participate in NEARS
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What characteristics of outbreak restaurants are linked with norovirus outbreak size?

Method
• 12 jurisdictions reported data into NEARS from 2009-2015
• Merged with data on number of ill people associated with those outbreaks

Data
• 179 single-setting, restaurant-related outbreaks
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- Restaurant was part of a chain
- Restaurant served fewer meals daily
- Restaurant required kitchen manager certification

Smaller number of outbreak cases (fewer ill people)
NEARS findings suggest that environmental factors, such as kitchen manager certification, can reduce the impact of norovirus.

NEARS findings provide novel information about outbreak prevention and intervention.
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What characteristics of outbreaks are linked with identification of contributing factors?

Method
11 jurisdictions reported data into NEARS from 2009-2013

Data
297 single-setting outbreaks
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An agent was identified

Environmental assessment occurred soon after outbreak identification

Multiple establishment visits were made to complete the environmental assessment

Outbreak establishment prepared all meals on location

Outbreak establishment served more meals a day

Contributing factor identified
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These NEARS findings provide novel information about ways to improve contributing factor identification.

Agent identification, and timely and complete outbreak assessments are important to contributing factor identification.

Establishment characteristics influence contributing factor identification.
Summary

Support of environmental assessments at the state and local level (Training)

Collection and analysis of environmental assessment data at the national level (NEARS)

Improved identification of environmental factors contributing to foodborne illness outbreaks

Improved investigation, prevention and intervention

Improved food safety
Thank you

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