Food Safety Tools for Regulatory Professionals in the 21st century

Vince Radke, MPH, RS, CP-FS, DAAS, CPH
Sanitarian
Centers for Disease Control and Prevention
Atlanta, GA

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Disclaimer

The views, findings and conclusions in this presentation are those of the author and do not necessarily represent the official position of the Centers for Disease Control and Prevention and the Department of Health and Human Services.

TOOLS

- Environmental Assessments
  - Critical Thinking
  - Contributing Factors
  - Antecedents
- Surveillance
  - National Voluntary Environmental Assessment Information System

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Information Critical To Regulators

- Food Vehicle Identification
- Contributing Factors To Outbreak
- Environmental Antecedents

Systems Approach to Investigating Disease Outbreaks

Using Environmental Assessments to Investigate Disease Outbreaks

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ENVIORNMENTAL ASSESSMENTS: WHAT ARE THEY?

Environmental Assessment

Types of Environmental Assessments

Past
- Foodborne Illness
- Outbreak Environmental Assessment

Present
- Routine Regulatory Inspections
- Physical Facility Plan Review
- HACCP Plan Development

Future

Everything external to the host, including air, food, water, animals, plants, climate, etc., as well as people, social and built environments.

How the environment can contribute or did contribute to the introduction and or transmission of agents that cause illness.

Routine Regulatory Inspections

Past Present Future

Physical Facility Plan Review

HACCP Plan Development
**Routine Regulatory Inspection**

- **Time frame context** – present
- **Focus** – implementation of regulatory requirements
  - May be framed by a HACCP or risk based inspection approach, but may not be
  - May be framed within a formal HACCP plan
- **Question** – What could cause the contamination of food or the survival or growth of pathogens given the present situation?

**Plan Review / HACCP Plan Development**

- **Time frame context** – future
- **Focus** – setting the stage for the future successful implementation of regulatory requirements
  - Plan Review – establishing a physical environment to support the successful implementation of regulatory requirements
  - HACCP plan development – identifying hazards, control points, critical limits (generally, regulatory requirements)
- **Question** – Given what we know today, what could cause the contamination of food or the survival or growth of pathogens given the expected future situation?

**CRITICAL THINKING**
Critical Thinking

Critical Thinking

FOODBORNE ILLNESS OUTBREAK
ENVIRONMENTAL ASSESSMENTS
Foodborne Illness Outbreak Environmental Assessments
- Describe how the environment contributes to the introduction and/or transmission of agents that cause illness
  - Component of an outbreak investigation
  - All aspects of the external environment can be listed as variables that, in relation to transmission, are:
    - neutral.
    - conducive or
    - protective.
  - From this description contributing factors and environmental antecedents to an outbreak can be determined.

- Is NOT an inspection

Objectives of Foodborne Illness Outbreak Environmental Assessment
- Identify contributing factors
- Identify environmental antecedents
- Generate recommendations for informed interventions

CONTRIBUTING FACTORS
**Contributing Factor Definition**

- The factors likely to be conducive to the contamination and survival of the etiologic agent or suspected agent and/or to its growth or proliferation.
  - Contamination Factors (C1-15)
    - Toxic substance part of the tissue, Contaminated raw product, Cross-contamination of ingredients, Bare-hand contact by a food handler/worker/preparer who is suspected to be infectious
  - Proliferation Factors (P1-12)
    - Improper cold holding due to malfunctioning refrigeration equipment, Improper hot holding due to improper procedure or protocol, Prolonged cold storage
  - Survival Factors (S1-4)
    - Insufficient time and/or temperature during cooking/heat processing, Insufficient time and/or temperature during reheating

**Contributing factors are NOT code violations**

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**ENVIRONMENTAL ANTECEDENTS**

**Environmental Antecedents Definition**

- Root causes
- Supporting factor(s) to the contamination, survival or increase of biological or chemical agents in food
- They may be related to
  - People
  - Equipment
  - Process
  - Food
  - Economics
  - Behavior
  - Other circumstances
SURVEILLANCE

Foodborne Disease Surveillance

- Disease Incidents (Outbreaks)
  - CDC’s National Outbreak Reporting System (NORS)
- Laboratory Isolation Of Pathogens
  - CDC’s PulseNet Program
- Sentinel Community Studies
  - CDC’s FoodNet Program
Where Do Food Safety Programs Fit?

- **Hazard Surveillance**
  - Not established but some steps in that direction
    - Routine Inspections
    - State and Local Baselines
    - FDA Contributing Factor Baseline

- **Foodborne Disease Incident Surveillance**
  - Environmental Assessment In Foodborne Outbreaks

Problems with Existing Contributing Factor Data Reported to NORS

- Categories of contributing factor data is more complex than what is reported
- Data is incomplete or missing
- Unsure of the meaning of contributing factor data that is reported
- Unclear how the contributing factors are determined
- No context for contributing factors that are reported
- Factors may not be reflective of farm or processing environment
The Public Health Challenge

“...public health surveillance and outbreak investigation programs have evolved independently from food safety programs, and current human health statistics address the questions of communicable disease control officials better than the questions of food control authorities.”

(ICMSF, 2006)

NATIONAL VOLUNTARY ENVIRONMENTAL ASSESSMENT INFORMATION SYSTEM (NVEAIS)

CFP Recommendation

A food regulatory program has a systematic approach for the detection, investigation, response, documentation, and analysis of alleged food-related incidents that involve illness, injury, unintentional, or deliberate food contamination. Regulatory programs are encouraged to also participate in the CDC National Voluntary Environmental Assessment Information System (NVEAIS). NVEAIS is designed to provide a more comprehensive approach to foodborne disease outbreak investigation and response and will provide a data source to measure the impact of food safety programs to further research and understand foodborne illness causes and prevention.
NVEAIS Rollout

- Piloting 2010
  - System is open for review and comment by potential users

- 2011
  - Foodborne Illness Outbreak Environmental Assessment Training to aid in conducting environmental assessments during foodborne illness outbreak investigations

- January 1, 2012
  - NVEAIS opens nationally for data reporting

NVEAIS

- [www.cdc.gov/nceh/ehs](http://www.cdc.gov/nceh/ehs)
  - Provides information about NVEAIS
  - Registration information
  - Information on how to use EHSNIS that houses NVEAIS

- Registering to use the NVEAIS
  - Send email to NVEAIS@cdc.gov
    - First and Last Name
    - E-mail address
      - which will be used to deliver an automated message to begin the registration process.

WHAT DOES ALL THIS MEAN?:

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EXAMPLE

- What caused the outbreak? *Campylobacter jejuni* (CJ) in the “cooked” chicken (EPI, LAB, ENV Assessment)

- Why was CJ in the “cooked” chicken? Insufficient temperature during cooking to kill CJ (Contributing Factor)

- Why was there insufficient temperature during the cooking process to kill CJ? The cook did not know the temperature (Environmental Antecedent – People variable)

**Relationship of Environmental Antecedents to Contributing Factors**

**Outbreak**

- Contamination at preparation step

**Contributing Factor A**

- Bare-hand contact by a food handler/worker/preparer who is suspected to be infectious

**Contributing Factor X**

**HOW CAN I USE IT?**

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Conclusions

- The environmental assessment in a foodborne outbreak investigation is critical to understanding contributing factors and potential antecedents to foodborne illness, yet information regarding potential antecedents is rarely captured.
- While current foodborne outbreak surveillance data may identify working while ill or poor handwashing practices as factors contributing to outbreaks, information on why these circumstances may have existed is not collected or reported.

Conclusions (Cont.)

- A systematic collection, analysis, interpretation, and dissemination of environmental data from foodborne disease outbreak investigations can support the overall foodborne disease surveillance system in a country, strengthening the ability of food control authorities at all levels of government to formulate food safety action and assess the effectiveness of these actions.

Your Role

- Lower the burden of foodborne illness
- Participate in understanding how and why foodborne illness outbreaks are occurring
  - Conduct environmental assessments during foodborne illness outbreaks
  - Enter environmental assessment data into NVEAIS
  - Educate food managers and workers about how and why foodborne illness occurs
Vince Radke

vradke@cdc.gov

www.cdc.gov

Thank you

Questions

For more information please contact Centers for Disease Control and Prevention

Telephone: (800) 232-4636/TTY: 1-888-232-6348

E-mail: cdcinfo@cdc.gov

Web: www.cdc.gov

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