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Capturing Data on Contributing Factors to Outbreaks With the National Environmental Assessment Reporting System

Editor's Note: NEHA strives to provide up-to-date and relevant information on environmental health and to build partnerships in the profession. In pursuit of these goals, we feature a column from the Environmental Health Services Branch (EHSB) of the Centers for Disease Control and Prevention (CDC) in every issue of the *Journal*.

In these columns, EHSB and guest authors share insights and information about environmental health programs, trends, issues, and resources. The conclusions in this column are those of the author(s) and do not necessarily represent the official position of CDC.

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Every year, roughly 1 in 6 Americans (48 million people) get sick, 128,000 are hospitalized, and 3,000 die of foodborne diseases (Centers for Disease Control and Prevention [CDC], 2016). Furthermore, more than half of all foodborne illness outbreaks in the U.S. are associated with restaurants (CDC, 2017). During outbreak investigations, environmental health and food safety staff conduct environmental assessments that identify contributing factors to help us learn how pathogens are spread in the environment. Data on contributing factors to outbreaks are critical to outbreak prevention. The Centers for Disease Control and Prevention's (CDC) National Environmental Assessment Reporting System (NEARS) is a surveillance system that captures environmental assessment data, including information about contributing factors.

What Are Contributing Factors?

In food safety, contributing factors are food preparation practices that lead to food getting contaminated, or that lead to pathogens growing or surviving in food. CDC identified 32 contributing factors and they fall into three types: contamination, proliferation, and survival (Figure 1).

The top contributing factors for NEARS-reported outbreaks in restaurants are when

- sick food workers contaminate ready-to-eat food through bare hand contact;
- sick food workers contaminate food through a method other than hand contact, such as with a contaminated utensil;
- sick food workers contaminate ready-to-eat food through glove-hand contact, such as touching a raw hamburger with gloves on and then touching the bun with the contaminated gloves; and

- food handling practices lead to growth of pathogens, such as food not kept cold enough.

What Does NEARS Data Tell Us About Contributing Factors?

Contributing factors were identified for 194 of 297 (3 out of every 5) outbreaks reported to NEARS during 2009–2013 from 11 participating jurisdictions (Brown, Hoover, Selman, Coleman, & Rogers, 2017). Contributing factors were more likely to be identified for outbreaks if

- the pathogen linked to the outbreak was known,
- the outbreak establishment prepared all meals on site,
- the outbreak establishment served more meals daily,
- investigators quickly (within a day of learning about the outbreak) contacted the establishment thought to be linked with an outbreak to schedule their assessment visit, or
- investigators made multiple visits to the outbreak establishment to complete their assessment.

Timely and complete outbreak assessments are important to identifying contributing factors. These findings highlight the need for strong environmental health and food safety programs with the capacity to complete such assessments.

How Can State and Local Food Regulatory Programs Identify Contributing Factors?

To identify contributing factors for foodborne illness outbreaks, environmental health and food safety staff should

FIGURE 1

The Three Types of Contributing Factors

THERE ARE THREE TYPES OF CONTRIBUTING FACTORS	FOOD PREPARATION PRACTICES THAT CONTRIBUTE TO	FOR EXAMPLE
Contamination	Pathogens and other hazards getting into food	A sick food worker handles food with their bare hands
Proliferation	Pathogens in food growing faster	Food is held in a refrigerator that is too warm
Survival	Pathogens surviving process to kill or reduce them	Food is not cooked long enough or to a hot enough temperature

Quick Links

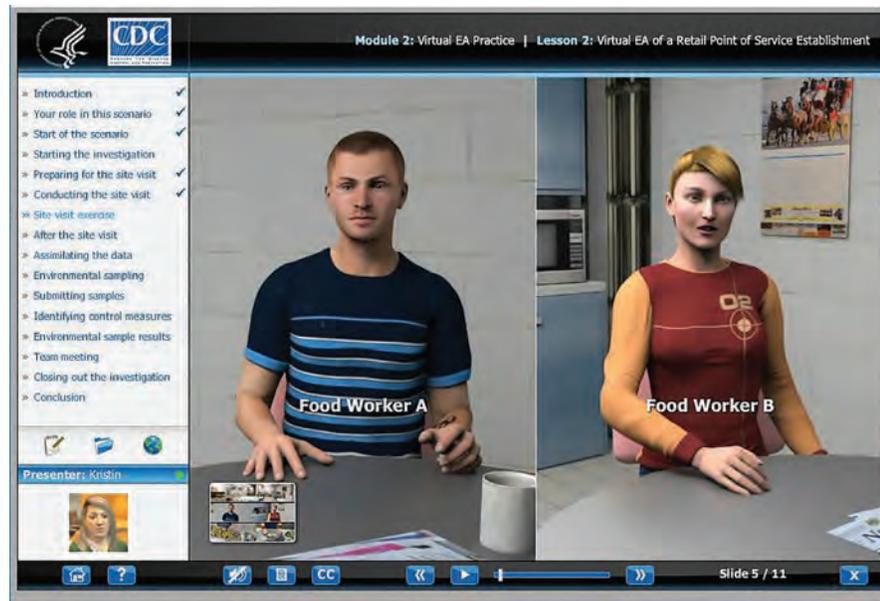
- National Environmental Assessment Reporting System: www.cdc.gov/nceh/ehs/nears
- Contributing factors: www.cdc.gov/nceh/ehs/nears/what-are-contributing-factors.htm
- More food safety resources: www.cdc.gov/nceh/ehs/activities/food.html

In addition, investigators can take CDC's free, interactive training on conducting environmental assessments (Figure 2). This training covers key activities of environmental assessments such as

- interviewing kitchen managers and food workers;
- observing how restaurants prepare food (e.g., food temperatures);
- reviewing or collecting records (e.g., records of food cooking temperatures and trace back records); and
- sampling for pathogens in the restaurant kitchen.

FIGURE 2

Environmental Assessment Training Screenshot of an Interview With Food Workers



Is Your Program Registered for NEARS?

NEARS is available for all state, local, tribal, and territorial food safety and environmental health programs (Figure 3). Participants provide critical data from environmental assessments to prevent and reduce future outbreaks. Your program can access and use your NEARS data at any time to

- identify environmental causes of outbreaks in your jurisdiction,
- take follow-up action to reduce or prevent future foodborne illness outbreaks,
- develop or modify program policies or regulations, and
- help your program meet the Food and Drug Administration's (FDA) Voluntary National Retail Food Regulatory Program Standards.

CDC and its national food safety partners use NEARS to analyze standardized data to understand how and why outbreaks occur and share findings to better respond to outbreaks and prevent future ones. In addition, regulatory agencies such as FDA use information from NEARS to develop interven-

- use their knowledge about the pathogen linked to the outbreak to guide their environmental assessment (e.g., if hepatitis A is the suspected pathogen, the investigator would seek information on whether food workers were sick and their food handling practices);
- conduct their assessment as soon as they learn of a potential outbreak; and
- conduct a complete assessment that might require multiple visits to the outbreak establishment.

tion strategies and recommended regulations such as the *Food Code*. CDC and national food safety partners recommend that all food safety programs use NEARS to improve food safety in the U.S. To learn more about NEARS, contributing factors, and environmental assessments, visit www.cdc.gov/nceh/ehs/nears. 🚗

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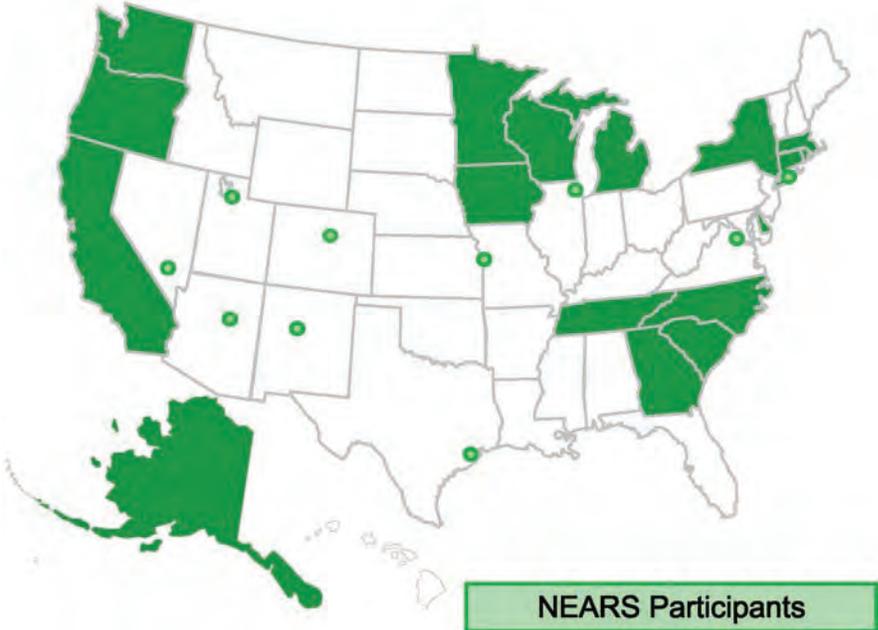
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FIGURE 3

National Environmental Assessment Reporting System (NEARS) Participants as of December 2017



Participating state agencies: Alaska Department of Environmental Conservation; California Department of Public Health; Connecticut Department of Public Health; Delaware Division of Public Health; Georgia Department of Public Health; Iowa Department of Public Health; Massachusetts Department of Public Health; Michigan Department of Agriculture and Rural Development; Minnesota Department of Health; New York State Department of Health; North Carolina Department of Health and Human Services; Oregon Health Authority; Rhode Island Department of Health; South Carolina Department of Health and Environmental Control; Tennessee Department of Health; Washington State Department of Health; and Wisconsin Department of Agriculture, Trade, and Consumer Protection.

Participating local agencies: Albuquerque Environmental Health Department (New Mexico); Chicago Department of Public Health (Illinois); Coconino County Public Health Services District (Arizona); Davis County Health Department (Utah); Fairfax County Health Department (Virginia); Harris County Health Department (Texas); Jefferson County Public Health (Colorado); Kansas City Health Department (Missouri); New York City Department of Health and Mental Hygiene (New York); and Southern Nevada Health District (Nevada).



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