



Foodborne Illness Outbreak Response Tools and Resources Survey

May 2022

**National Environmental Health Association
in Conjunction With the
Retail Food Safety Regulatory Association Collaborative
Federal Award 1U18FD007050**



Contents

Executive Summary	3
Introduction.....	3
Background	4
Preparing for a Foodborne Illness Outbreak	4
Foodborne Illness Outbreak Response.....	5
Surveillance Systems	5
Methods	6
Results	6
Response Rates, Program Types, and Respondent Roles	6
Preparing for a Foodborne Illness Outbreak	7
Responding to a Foodborne Illness Outbreak	8
Meeting Voluntary National Retail Food Regulatory Program Standard 5.....	10
Shared Resources	10
Resource and Tool Needs	11
Discussion	12
Recommendations.....	12
Acknowledgements.....	13
References	13

Executive Summary

Foodborne illness outbreak (FBIO) investigations are one of the most important functions food safety regulatory programs perform to protect public health.

In 2021, the National Environmental Health Association (NEHA), in conjunction with the Retail Food Safety Regulatory Association Collaborative (Collaborative) partners, conducted an assessment to collect information regarding outbreak response resources used by state, local, tribal, and territorial (SLTT) retail food safety regulatory programs throughout the U.S. The assessment aimed to identify key resources and model practices used to prepare for and respond to outbreaks. The survey was promoted through a series of presentations, social media marketing, and direct messaging.

The majority of the 25 survey responses were received from state and local food safety regulatory programs. The most frequently used resources for FBIO investigation preparation were training and resource materials developed by the regulatory program responding to the survey, resources such as the Food and Drug Administration's (FDA) Office of Regulatory Affairs University (ORAU) classes and website resources developed by FDA, and resources and trainings from the Integrated Food Safety Centers of Excellence. For responding to outbreaks, food safety regulatory programs identified frequent use of the National Environmental Assessment Reporting System (NEARS), Council to Improve Foodborne Outbreak Response (CIFOR) Guidelines, and National Outbreak Reporting System (NORS). Respondents also identified several areas where they have additional training or resource needs including food and environmental sampling, interview skills, and tabletop exercises for outbreak response.

Introduction

FBIO preparation, response, and surveillance play key roles in protecting public health and supporting our economy. Every year in the U.S., 48 million people fall ill, 128,000 are hospitalized, and 3,000 die from foodborne illness (Centers for Disease Control and Prevention [CDC], 2018a; Scallan et al., 2011). In addition, the U.S. Department of Agriculture (USDA) Economic Research Service (2022) estimated the economic burden of foodborne illness to be about \$17.6 billion in 2018 dollars, which represents expenditures on medical care as well as lost wages associated with foodborne illnesses. The retail food industry is also heavily affected by foodborne illness: a single FBIO can cost up to \$1.9 million for a fast-food restaurant or up to \$2.6 million for a fine-dining restaurant (Bartsch et al., 2018). As the majority of foodborne illnesses are not reported to the Centers for Disease Control and Prevention (CDC) as part of an outbreak, the public health and economic burden of foodborne illness is likely more severe (Lynch et al., 2006).

Outbreak response occurs at state, local, tribal, territorial, and national levels, and response efforts depend on the size and type of outbreak and varying jurisdictional policies, procedures, and regulations. Local health departments and independently administered governmental environmental public health departments that often face barriers around staffing, capacity, and funding are frequently among the first responders to outbreaks. It is vital that food safety professionals in these departments have access to tools, resources, education, model practices, and support networks to ensure they are equipped to effectively and efficiently respond to and prevent future outbreaks.

A multitude of resources exist to assist SLTT food safety programs with outbreak preparation, response, and surveillance. This evaluation aimed to determine the resources most often used by SLTT food safety regulatory programs both in preparation for and response to outbreaks. The resources included in this study are outlined in the background section of this report to provide more information on specific topics and to demonstrate the interconnectivity of organizations and agencies that provide support in outbreak situations.

This evaluation was also designed to help identify tools or resources that might be missing from the collections of the responding programs. The Collaborative intends to use the results of this survey to identify and fill gaps by connecting food safety regulatory programs to key materials and model practices for FBIO investigations and surveillance.

Background

Preparing for a Foodborne Illness Outbreak

Preparation and training by food safety regulatory programs are important to ensure that staff is equipped to act quickly and efficiently in the occurrence of an outbreak. The FDA Office of Training Education and Development maintains a menu of trainings to assist regulatory personnel in preparing for an FBIO investigation. These resources can be located on its website for training and continuing education (FDA, n.d.). CDC (2022a) has developed the Environmental Assessment Training Series (EATS), a free, interactive online training program aimed at developing the skills of an FBIO investigator.

NEHA administers a training and education program that includes capacity building on outbreak response and a credential, the Certified Foodborne Outbreak Investigator (CFOI). The CFOI credential was designed for food safety professionals to demonstrate expertise in the principles of food safety knowledge specifically as it pertains to outbreak response (NEHA, 2022a). Additionally, in conjunction with CDC, NEHA developed the Epi-Ready Team Training, a 2-day, in-person workshop that focuses on the roles of environmental and public health professionals during an FBIO investigation, which is now hosted by CDC's Integrated Food Safety Centers of Excellence (NEHA, 2022b).

CIFOR, an assembly of public health professionals from several national associations and federal agencies, publishes role-specific guidelines and tool kits on its website or in print for food safety professionals, regulators, and the industry (CDC, 2018b). The CIFOR *Guidelines for Foodborne Disease Outbreak Response* contain a chapter dedicated to cluster and outbreak investigation, which includes information about the roles of environmental health specialists, epidemiologists, and public health laboratorians in outbreak response (CIFOR, 2020).

Retail food safety programs that have established systems to prepare for and respond to outbreaks commonly meet Standard 5 of the Voluntary National Retail Food Regulatory Program Standards (Retail Program Standards). The Retail Program Standards provide a road map to achieving excellence in food safety and can be used as a guide to build, maintain, and improve regulatory programs (FDA, 2022a).

Foodborne Illness Outbreak Response

In addition to preparation resources, several resources exist to help food safety regulatory programs effectively respond to outbreaks including the Rapid Response Team (RRT) program and NEARS, among others. RRTs are multidisciplinary teams of professionals who work together to efficiently respond to and implement control measures in the event of an outbreak. FDA funding currently supports RRTs in 21 states and an additional 3 nonfunded states participate (FDA, 2022b).

During an FBIO investigation, investigators use sampling to identify the source of the infectious organisms causing illness. Inspectors might also conduct product sampling of food products or environmental sampling in food production facilities to identify foodborne contaminants and prevent contaminated products from reaching the public and causing illness (FDA, 2022c). The Association of Food and Drug Officials (AFDO, 2022) offers an environmental sampling workshop and training course for inspectors who are performing root cause analysis. The International Food Protection Training Institute (n.d.) also provides training in these areas through its environmental monitoring course.

After the outbreak is controlled, investigators at the SLTT level can capture environmental assessment data that can be used to determine root causes and help prevent future outbreaks. CDC's NEARS utilizes these data to analyze why outbreaks occur and makes recommendations for avoiding future outbreaks, including considerations that inform the composition of the FDA model *Food Code* (CDC, 2022b).

Surveillance Systems

National surveillance systems exist to help detect outbreaks and improve FBIO response. NORS is a web-based tool that allows health departments and independently administered governmental environmental public health programs to input data on outbreaks. NORS functions to collect valuable data regarding outbreak pathogens that complement NEARS environmental assessment data

and help to streamline surveillance and prevent future outbreaks (CDC, 2019). CDC also maintains PulseNet, a nationwide surveillance tool that utilizes bacterial DNA fingerprints from laboratories across the country to identify patterns (CDC, 2016). This national laboratory network connects illnesses to outbreaks, which helps to identify outbreaks rapidly and aids in interagency communication.

Methods

The [Foodborne Illness Outbreak Response Resources Survey](#) was designed for individuals currently working in retail food safety regulatory programs that assist in the preparation for and response to outbreaks. The online survey asked participants to respond to eight questions related to respondents' regulatory program types and roles, tools and resources they use to prepare for and respond to outbreaks, tools and resources that they feel are missing, and their programs' enrollment in the Retail Program Standards, specifically Standard 5.

The survey was announced and shared during a presentation at the AFDO Annual Education Conference on June 16, 2021, and remained open until October 1, 2021. Preliminary results from the survey were displayed on the Collaborative website beginning in July 2021. During the time the survey was open, the survey link was:

- presented at a Collaborative presentation at the NEHA Annual Educational Conference & Exhibition in July 2021;
- emailed to 162 Collaborative email list subscribers in August 2021; and
- shared on Collaborative and NEHA social media channels (e.g., LinkedIn, Facebook, and Twitter) twice per week for four weeks.

Results

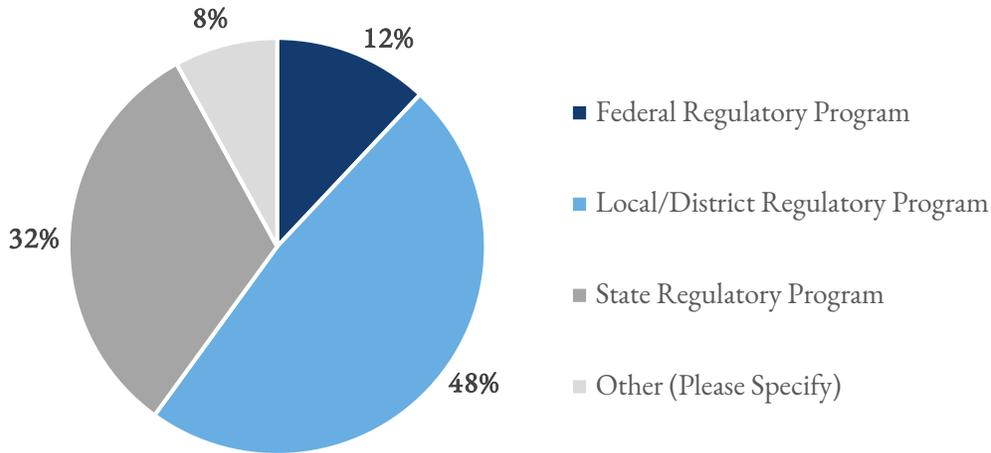
Response Rates, Program Types, and Respondent Roles

Most Respondents Work at the Local or District Level

A total of 25 surveys were completed between July 16 and October 1, 2021. Almost one half of the respondents (48%) were from a local or district food safety regulatory program (Figure 1). Furthermore, 32% were from a state regulatory program and 12% were from a federal regulatory program. Those respondents that chose "other" described themselves as industry support (i.e., providing regulations-compliant food-safe sanitation tools to retail establishments) and as an international association.

Figure 1

Program Type of Survey Respondents



Over one half (60%) of the respondents identified as an environmental health specialist, sanitarian, or inspector. Of the remaining respondents, 20% identified as a foodborne illness investigator/specialist, 16% identified as a regulatory manager/supervisor, and 1% identified as an epidemiologist and regulatory program director. Other roles included education and technical support manager, president of food safety, NEARS administrator, and special processes HACCP (hazard analysis critical control point) specialist.

The following information summarizes the 25 survey responses. Not all respondents answered every question.

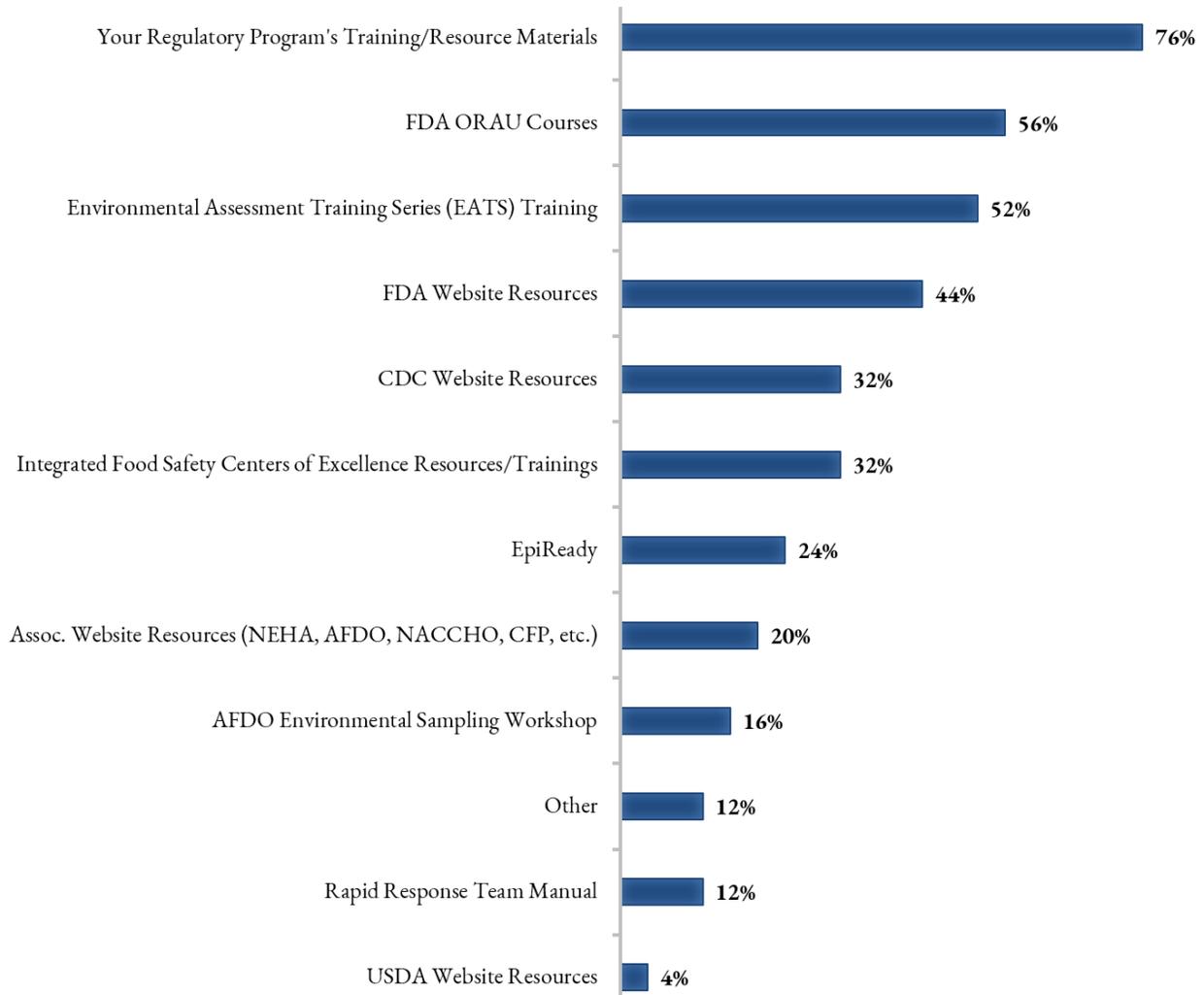
Preparing for a Foodborne Illness Outbreak

Respondents Frequently Use Internal Trainings and Resources

The first question asked which training tools and resources the respondent's regulatory program uses to prepare for a retail FBIO (Figure 2). The question allowed respondents to select all options that applied and included an option to provide "other" answers. By far, the most frequently mentioned training tools and resources used was the regulatory program's training and resource materials (76%).

Figure 2

Foodborne Illness Outbreak Preparedness Training Tools and Resources Accessed



Other resources named by respondents included a program-specific outbreak response protocol, food safety resources at a knowledge center, and their jurisdiction’s epidemiologist.

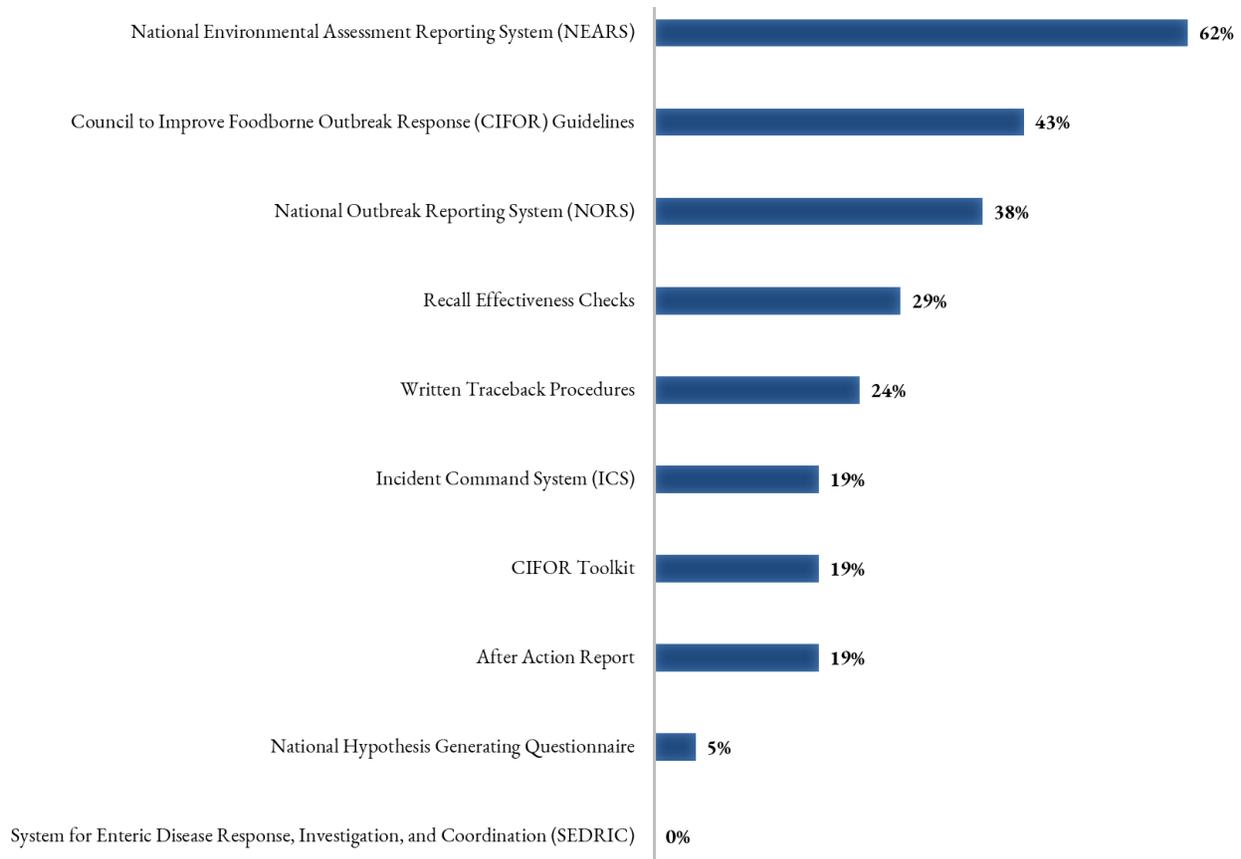
Responding to a Foodborne Illness Outbreak

A Variety of Resources Are Used When Responding to an Outbreak

The next question asked which training tools and resources a respondent’s regulatory program uses to respond to a retail FBIO (Figure 3). The question allowed respondents to select all options that applied and included an option to provide “other” answers. The training tool and resource most frequently mentioned was NEARS (62%), followed by the CIFOR *Guidelines for Foodborne Disease Outbreak Response* (43%).

Figure 3

Foodborne Illness Outbreak Response Training Tools and Resources Used



Many respondents commented on additional resources, trainings, and procedures they use to respond to an outbreak. These additional comments included program-developed tools and resources, tools and resources from FDA, resources from the Centers of Excellence, CDC resources, and internal staff expertise. Respondents specifically mentioned the following resources, trainings, and procedures.

Resources

- Pathogen-specific checklists created for responding to outbreaks (based on suspect or confirmed pathogen)
- Colorado Integrated Food Safety Center of Excellence: <https://coloradosph.cuanschutz.edu/research-and-practice/centers-programs/foodsafety>
- Tennessee Integrated Food Safety Centers of Excellence: <https://foodsafety.utk.edu/>
- Code of Federal Regulations Title 21: <https://www.ecfr.gov/>
- European & International Standards for Food, Feed, and Chemical Safety in the Supply Chain (ENFIT): Transport of unpacked raw materials and food in the transport container

- International Association for Food Protection *Procedures to Investigate Foodborne Illness*: <https://www.foodprotection.org/publications/other-publications/>

Trainings

- Environmental Assessment Just-in-Time Training: <https://rmphtc.org/pages/eajitt/>
- CDC EATS: <https://eats.cdc.gov>

Procedures

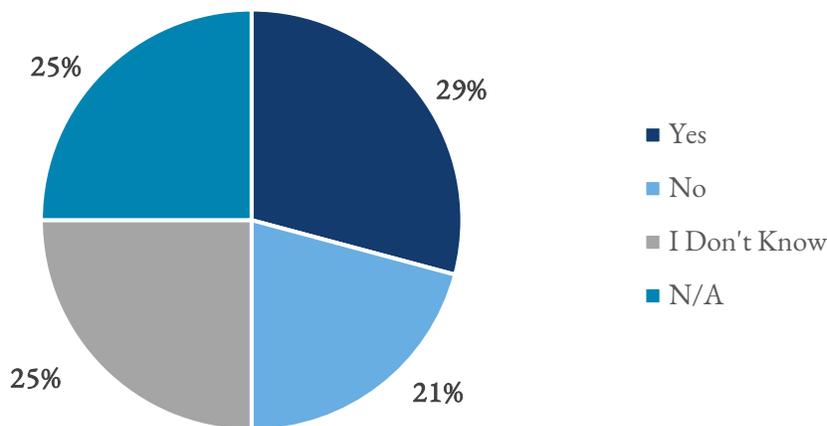
- A HACCP-based inspection conducted by an inspector
- Partnership with a public health nurse to contact complainant(s) to gather information
- Notification to other agencies when necessary for assistance and for specimen sample kits as needed
- Following investigative steps and collecting samples as determined by an epidemiologist

Meeting Voluntary National Retail Food Regulatory Program Standard 5

A survey question asked respondents to indicate if they have met Standard 5 of the Retail Program Standards. While 25% of the respondents said they were not enrolled in the Retail Program Standards, of those respondents who were enrolled, 29% had met Standard 5. Furthermore, 21% had not met the standard and 25% did not know if their program had met the standard (Figure 4).

Figure 4

Met Standard 5 of the Voluntary National Retail Food Regulatory Program Standards



Shared Resources

To identify other resources available, respondents were asked to share links to outbreak response resources they use that were not already mentioned in the survey. The following links and resources were provided:

- Foodborne Diseases Centers for Outbreak Response Enhancement (FoodCORE): <https://www.cdc.gov/foodcore/about.html>
- International Association for Food Protection *Procedures to Investigate Foodborne Illness*: <https://www.foodprotection.org/about/news-releases/iafp-procedures-to-investigate-foodborne-illness-revised/>
- Private company website: <https://remcoproducts.com/>
- Minnesota Integrated Food Safety Center of Excellence resources: <http://mnfoodsafetycoe.umn.edu/resources/>
- State-specific (i.e., Minnesota) outbreak response protocol: <https://www.health.state.mn.us/communities/environment/food/pwdu/protocol.html>
- State-specific (i.e., Massachusetts) information on foodborne illness investigations: <https://www.mass.gov/lists/foodborne-illness-investigations>

Resource and Tool Needs

Respondents were asked to identify what resources and tools are needed to improve their FBIO investigation response. Several needs and gaps were shared.

Training Needs

- Food and environmental sampling during an outbreak investigation, introductory trainings for inspectors
- Interview training for inspectors to assist in identifying the root cause of an outbreak
- Ready-to-use tabletop exercises to train staff and/or refresh staff on outbreak response
- “Real-world practice”

Resources

- Consistent information across resources
- Improved program-specific guidance

Discussion

While there is an abundance of FBIO prevention and response trainings and tools in circulation, it is clear that certain resources are used more frequently than others by food safety regulatory programs. Survey results indicate that CDC and FDA systems and websites are frequently used in training and preparation for FBIO investigations, as well as resourced during the response phase.

In addition, programs work closely with partners, such as epidemiologists and public health nurses, during outbreak investigations. The majority of survey respondents use their program's materials, suggesting that collaboration between food safety regulatory programs could help to identify valuable and useful materials. Conversely, the use of a program's materials could indicate silos in outbreak response patterns by regulatory food programs, ultimately creating inconsistency in response. This inconsistency is of particular importance when responding to multistate outbreaks.

Survey responses also highlight gaps in resources and training, including food and environmental sampling during an outbreak investigation, interviewing techniques for root cause analysis, and ready-to-use outbreak tabletop exercises.

This assessment is limited by its very small sample size; the results are not representative of the nation's regulatory food safety community as a whole. There were 25 responses, largely from representatives of state, local, and federal food regulatory programs, which is a small part of the 64 state regulatory agencies and approximately 3,000 local regulatory food programs throughout the country.

Recommendations

Future efforts to improve the efficiency and effectiveness of outbreak preparation and response, as well as address the gaps and needs identified in this survey, should focus on highlighting consistent, evidence-based information and sharing model practices. We recommend the following:

- Conduct a scan and identify existing materials offered by regulatory food programs and associations
- Review identified resources to determine model practices
- Create more standardized guidance for resources
- Create a repository for materials

The Retail Food Safety Regulatory Association Collaborative could help coordinate efforts around these recommendations. The identification of model practices, resources, and guidance materials could help to alleviate silos and inconsistencies in practice among food safety regulatory programs. The collection of these resources in a repository creates one central, easily accessible, and searchable place that could assist food safety regulatory programs in their responses while reducing time spent on creating materials. Of course, it is important to use discretion in the selection of materials to ensure the

repository is helpful and not overwhelming. Focus should be given to creating a standardized menu of training that encompasses all of the necessary elements needed for outbreak preparation and response, along with the respective model practice resources, without overloading environmental health professionals with a deluge of similar resources.

Conducting this survey again with a larger sample size would better represent the approximate 3,000 SLTT food safety programs across the U.S. This endeavor could provide a more accurate picture of the tools and resources used in outbreak preparation and response as well as identify any gaps.

Finally, the creation of a one-stop shop for the most current, science-based, tested, and proven resources would support the work of environmental health professionals and bolster their skills and abilities in FBIO preparation and response.

Acknowledgements

This project was supported by the Food and Drug Administration (FDA) of the U.S. Department of Health and Human Services (HHS) as part of a financial assistance award (FAIN) totaling \$1,500,000 with 100% funded by FDA/HHS. The contents of this report are those of the author(s) and do not necessarily represent the official views of, nor an endorsement by, FDA/HHS or the U.S. government.

References

- Association of Food and Drug Officials. (2022). *Root cause analysis for retail food safety course—January*. <https://www.afdo.org/events/root-cause-analysis-for-retail-food-safety-course-january/>
- Bartsch, S.M., Asti, L., Nyathi, S., Spiker, M.L., & Lee, B.Y. (2018). Estimated cost to a restaurant of a foodborne illness outbreak. *Public Health Reports, 133*(3), 274–286. <https://doi.org/10.1177/0033354917751129>
- Centers for Disease Control and Prevention. (2016). *PulseNet: Outbreak detection*. <https://www.cdc.gov/pulsenet/outbreak-detection/index.html>
- Centers for Disease Control and Prevention. (2018a). *Estimates of foodborne illness in the United States*. <https://www.cdc.gov/foodborneburden/2011-foodborne-estimates.html>
- Centers for Disease Control and Prevention. (2018b). *Council to Improve Foodborne Outbreak Response (CIFOR)*. <https://www.cdc.gov/ncezid/dfwed/food-safety-office/cifor.html>

- Centers for Disease Control and Prevention. (2019). *About NORS*. <https://www.cdc.gov/nors/about.html>
- Centers for Disease Control and Prevention. (2022a). *Environmental Assessment Training Series (EATS)*. <https://www.cdc.gov/nceh/ehs/elearn/eats/index.html>
- Centers for Disease Control and Prevention. (2022b). *National Environmental Assessment Reporting System (NEARS)*. <https://www.cdc.gov/nceh/ehs/nears/index.htm>
- Council to Improve Foodborne Outbreak Response. (2020). *Guidelines for foodborne disease outbreak response*. <https://cifor.us/downloads/clearinghouse/CIFOR-Guidelines-Complete-third-Ed.-FINAL.pdf>
- Food and Drug Administration. (2022a). *Voluntary National Retail Food Regulatory Program Standards—November 2019*. <https://www.fda.gov/food/voluntary-national-retail-food-regulatory-program-standards/voluntary-national-retail-food-regulatory-program-standards-november-2019>
- Food and Drug Administration. (2022b). *Rapid Response Teams (RRTs)*. <https://www.fda.gov/federal-state-local-tribal-and-territorial-officials/national-integrated-food-safety-system-ifss-programs-and-initiatives/rapid-response-teams-rrts>
- Food and Drug Administration. (2022c). *Sampling to protect the food supply*. <https://www.fda.gov/food/compliance-enforcement-food/sampling-protect-food-supply>
- Food and Drug Administration. (n.d.). *Training and continuing education*. <https://www.fda.gov/training-and-continuing-education>
- International Food Protection Training Institute. (n.d.). *Online courses*. <https://www.ifpti.org/online-courses>
- Lynch, M., Painter, J., Woodruff, R., & Braden, C. (2006). Surveillance for foodborne-disease outbreaks—United States, 1998–2002. *Morbidity and Mortality Weekly Report*, 55(SS10), 1–34. <https://www.cdc.gov/mmwr/preview/mmwrhtml/ss5510a1.htm>
- National Environmental Health Association. (2022a). *Certified Foodborne Outbreak Investigator (CFOI) credential*. <https://www.neha.org/professional-development/credentials/cfoi-credential>

National Environmental Health Association. (2022b). *Epi-Ready Team Training*.
<https://www.neha.org/node/62201>

Scallan, E., Hoekstra, R.M., Angulo, F.J., Tauxe, R.V., Widdowson, M.-A., Roy, S.L., Jones, J.L., & Griffin, P.M. (2011). Foodborne illness acquired in the United States—Major pathogens. *Emerging Infectious Diseases*, 17(1), 7–15. <https://doi.org/10.3201/eid1701.p11101>

U.S. Department of Agriculture, Economic Research Service. (2022). *Cost estimates of foodborne illnesses*. <https://www.ers.usda.gov/data-products/cost-estimates-of-foodborne-illnesses>