CHAPTER

3

Planning and Preparation: Building Teams

CHAPTER SUMMARY POINTS

- This chapter describes the roles of the core outbreak investigation and control team members and major agencies and partners involved in foodborne illness outbreak response and highlights the resources, processes, and relationships that should be in place before an outbreak.
- Agency plans, training programs, and response partner working relationships must anticipate the need to rapidly expand and contract the scope and structure of investigation and control teams to address changing conditions.
- Key roles in outbreak detection and response include epidemiology, environmental health and public health, and laboratory practice.
- A core team should be involved in all outbreak investigation and control efforts, giving consistency to investigations, serving as the focal point for coordinating multidisciplinary and/or multiagency tasks, and enabling development of effective working relationships with external partners and advanced expertise among staff.

URLs in this chapter are valid as of August 7, 2019.

3.0 Introduction

3.0.1 This chapter describes the roles of the core outbreak investigation and control team members, major agencies, and partners involved in foodborne illness outbreak response and highlights the resources, processes, and relationships that should be in place before an outbreak. Agencies must be prepared to mount and participate in effective single-agency and multiagency responses to incidents ranging from local to potentially national in scope. The authority to identify, investigate, and control foodborne illness outbreaks is shared across local, state, territorial, tribal, and federal government agencies. Each agency at every level of government has specific roles and responsibilities.

3.0.2 Agency plans, training programs, and response partner working relationships must anticipate the need to rapidly expand and contract the scope and structure of investigation and control teams to address changing conditions. All agencies should maintain standard procedures and all-hazards emergency operations plans identifying the mechanisms for conducting routine and nonroutine investigations and responses. This chapter promotes practices that have been helpful in developing effective multidisciplinary foodborne illness investigation and control teams and provides links to related topics. These Guidelines contain detailed information about outbreak investigation and response. All responsible agencies should regularly work with their attorneys to anticipate legal issues that can arise during foodborne illness outbreak investigation and control. (See Chapter 2 for details about legal preparedness and the CIFOR law project that provides additional tools to help agencies and jurisdictions improve legal preparedness.)

3.1 Roles

3.1.1 Key roles in outbreak detection and response include epidemiology, environmental health, and laboratory. These roles are distributed across the multiple entities—more than 3,000 local health departments, more than 50 state and territorial health departments, other state agencies, tribal organizations, and several federal agencies—that interact in a complex system to detect and respond to enteric and other human and animal foodborne illnesses. These roles include conducting surveillance to detect outbreaks through complaint-based, pathogen-specific, or other forms of surveillance (Chapter 4) and rapidly conducting outbreak investigation activities to identify the mode of transmission and vehicle (Chapter 5) and determine the potential for ongoing transmission and need for control procedures (Table 5.1 in Chapter 5; Chapter 6).

3.1.2 Agencies' roles, responsibilities, and resources influence outbreak responses. The nature of the outbreak, including the type of pathogen or contaminant, severity of illness, suspected or implicated vehicle, number and location of affected persons, geographic jurisdictions involved, and local and state food safety rules and laws (Chapter 2) determine the individuals, disciplines (further discussed in section 3.2), and types of agencies that need to be involved. (Table 7.3 in Chapter 7 provides detailed information about multijurisdictional outbreak identification methods and required notification steps, by agency level).

Each agency's response plan should include its likely role in a foodborne illness outbreak investigation, staff (or positions) that may be involved, contact information for relevant external agencies, and communication and escalation procedures for working with those agencies.

3.1 Roles

3.1.3 Local and state (Table 3.1) and federal (Table 3.2) levels, other important cross-agency programs (Table 3.3), and nongovernment, industry and academic partners (Table 3.4) contribute to foodborne illness investigation and outbreak response. For local and state agencies, responsibilities vary depending on a state's organizational, legal, and regulatory structure; the distribution of responsibilities across different types of local and state agencies; and the size and capacity of the local agencies. Responsibilities for federal agencies follow regulatory jurisdictions for Food and Drug Administration (FDA) and the U.S. Department of Agriculture's (USDA's) Food Safety Inspection Service (FSIS), and public health surveillance and disease control mandates for the Centers for Disease Control and Prevention (CDC).

In addition to these primary federal agencies, several other federal jurisdictions may be relevant to outbreak investigations. The National Park Service may have exclusive or shared jurisdiction with state and local agencies depending on legislation designating the specific park. Local and state agencies whose jurisdiction contains or adjoins a national park should establish relationships with the National Park Service Office of Public Health. On many other types of federal lands, state laws apply, but federal agencies may have overlapping responsibilities. The Department of Defense has autonomous authority over U.S. military bases, facilities (including food production, food service, and healthcare facilities), and vehicles.

Indigenous tribes have complete sovereignty and are completely autonomous. Investigations on tribal land may be conducted by tribal health staff, Indian Health Service staff, or state or local health agencies, but nontribal entities can become involved in an investigation only at the tribe's request. Memoranda of understanding may establish lines of communication and reciprocal support during public health emergencies.

Law enforcement agencies at multiple levels will become involved in an investigation if intentional contamination of food or other criminal activity is suspected. Agencies responsible for controlling foodborne illness outbreaks should establish relationships and communication pathways with law enforcement agencies before any outbreak.

Table 3.1. Examples of Typical Foodborne Outbreak Investigation Roles, Responsibilities, and Contributions of Local and State Agencies*

AGENCY	ROLES, RESPONSIBILITIES, AND CONTRIBUTIONS
Local health agencies and laboratories	Responsible for local policies to protect public health: • Maintain communication and working networks with local populations and community businesses, healthcare providers and community organizations, and other local resources. • Regulate and inspect food service establishments and educate food workers about food safety. • Conduct complaint-based, pathogen-specific, and other forms of surveillance to identify local outbreaks. • Investigate and control potential foodborne illnesses using local authorities, policies, and resources. • Manage local public risk communication during foodborne outbreaks. • Coordinate investigation and communication activities with other agencies and response partners during multijurisdictional outbreaks. • Conduct after-action reviews to improve investigation effectiveness and prevent future outbreaks from the same causes.

3.1 Roles

Table 3.1. Examples of Typical Foodborne Outbreak Investigation Roles, Responsibilities, and Contributions of Local and State Agencies* *Continued*

AGENCY	ROLES, RESPONSIBILITIES, AND CONTRIBUTIONS
State health department and laboratories	Responsible for statewide public health protection: • Conduct statewide pathogen-specific surveillance; some states may also coordinate statewide complaint-based surveillance. • Provide technical assistance and surge capacity for local and state response partner agencies as needed; conduct investigations in local areas without local health agency jurisdiction. • Conduct and coordinate statewide or multijurisdictional investigations of outbreaks of human illness, including foodborne illness outbreaks. • Manage statewide public risk communication during foodborne illness outbreaks. • Serve as liaison with nongovernment response partners and stakeholders, including healthcare providers and food industry representatives. • Provide legal support for outbreak investigation and control activities. • Conduct after-action reviews to improve investigation effectiveness and prevent future outbreaks from the same causes.
State food safety regulatory authorities and laboratories†	Responsible for statewide policies to protect food safety: • Conduct routine regulatory inspections and activities for food establishments under their jurisdiction. • Maintain 1) knowledge of food industry practices in their jurisdiction and 2) working relationships with food industry managers, associations, and technical experts. • Conduct investigations of food producers, food establishments, and food supply chains within their jurisdiction, including product tracing investigations (traceback, traceforward), environmental health assessments, sampling, and implementation of regulatory control measures. • Provide technical assistance and surge capacity for local and state response partner agencies as needed. • Coordinate response actions with local, state, and national food supply stakeholders and response partners, including law enforcement for instances of suspected intentional contamination. • Conduct after-action reviews to improve investigation effectiveness and prevent future outbreaks from the same causes.

*The three core disciplines involved in foodborne outbreaks—epidemiology, environmental health/food regulatory program, and laboratory—may be housed in the same agency at the state or local level.
†Agencies with different names (e.g., Department of Agriculture, Health, or Environmental Health) may carry out these roles.

3.1 Roles

Table 3.2. Examples of Typical Foodborne Illness Outbreak Investigation Roles, Responsibilities, and Contributions of Primary Federal Agencies

AGENCY	ROLES, RESPONSIBILITIES, AND CONTRIBUTIONS
U.S. Food and Drug Administration (FDA, DHHS)	Responsible for investigation and regulation of most foods moving in interstate commerce (except products regulated by the U.S. Department of Agriculture's Food Safety and Inspection Service [USDA-FSIS]) (Appendix) • Perform regulatory activities, including facility registration, routine risk-based inspections, limited food supply surveillance testing, and compliance and enforcement. • Publish voluntary regulatory food safety standards for food service and retail food establishments (the model FDA Food Code) *(1)*. • Coordinate and collaborate with international food regulatory agencies, and support capacity building and training in product-related aspects of investigation and laboratory methods pertaining to foods that FDA regulates. • Conduct outbreak investigations: The Coordinated Outbreak Response and Evaluation network (CORE) *(2)* for investigations of human illness potentially linked to human food, the National Shellfish Sanitation Program (NSSP) for human illness potentially linked to shellfish products, the Center for Veterinary Medicine for human illness potentially linked to animal food or feed, and the Office of Emergency Operations. • Coordinate with states on informational product tracing for use as part of exposure assessments in epidemiologic studies potentially linked to FDA-regulated products. • Conduct investigations and environmental health assessments of food establishments under their jurisdiction in coordination with other government partner agencies. • Conduct laboratory testing of product(s) obtained from commerce, consumer homes, or production. • Coordinate communication with states and with other federal agencies, particularly CDC, during foodborne outbreak investigations. • mplement short- and long-term control measures and follow-up activities as needed to protect public health consistent with regulatory authorities. • Conduct after-action reviews.

3.1 Roles

Table 3.2. Examples of Typical Foodborne Illness Outbreak Investigation Roles, Responsibilities, and Contributions of Primary Federal Agencies *Continued*

AGENCY	ROLES, RESPONSIBILITIES, AND CONTRIBUTIONS
FSIS, USDA	Responsible for ensuring that meat, poultry, and processed egg products are safe, wholesome, and accurately labeled: • Perform inspection and regulatory activities to ensure industry compliance with applicable laws, pathogen reduction and hazard analysis and critical control point system regulations and other regulations, robust food supply surveillance testing, and compliance and enforcement. • Perform scientific and technical assessments of known and emergent hazards, including quantitative microbial risk assessments. • Conduct outbreak investigations: In-plant inspectors at FSIS-regulated establishments with operational knowledge of industry food safety systems (Office of Field Operations); in-commerce compliance investigators with expertise in sample collection and informational traceback (Office of Investigation, Enforcement, and Audit); and public health science personnel with expertise in performing epidemiologic and environmental assessments (Office of Public Health Science). • Perform informational traceback for use as part of exposure assessments in epidemiologic studies potentially linked to FSIS-regulated products, coordinating with states, where possible. • Conduct investigations and environmental assessments of FSIS-regulated establishments and in-commerce facilities in coordination with other government partner agencies. • Conduct laboratory testing of product(s) collected from FSIS-regulated establishments, in-commerce facilities, and consumer homes. • Assess testing results from non-FSIS laboratories to determine whether they can be used to support FSIS outbreak response. • Coordinate communication and exchange information with states and other federal agencies, particularly CDC, during foodborne outbreak investigations. • Implement short- and long-term control measures and follow up activities as needed to protect public health consistent with regulatory authorities. • Conduct after-action reviews.

3.1 Roles

Table 3.2. Examples of Typical Foodborne Illness Outbreak Investigation Roles, Responsibilities, and Contributions of Primary Federal Agencies *Continued*

AGENCY	ROLES, RESPONSIBILITIES, AND CONTRIBUTIONS

CDC, DHHS	Responsible for conducting or coordinating surveillance for human illnesses caused by pathogens commonly transmitted through food and for outbreaks of foodborne illnesses of any cause:
	• Lead and support national surveillance, communication and disease investigation networks, including National Notifiable Disease Surveillance System (NNDSS), Foodborne Diseases Active Surveillance Network (FoodNet), The National Molecular Subtyping Network for Foodborne Disease Surveillance (PulseNet), NEARS National Environmental Assessment Reporting System, Foodborne Disease Outbreak Surveillance System (FDOSS), National Outbreak Reporting System (NORS), Foodborne Disease Centers for Outbreak Response Enhancement (FoodCORE), OutbreakNet Enhanced (OBNE), the Integrated Food Safety Centers of Excellence (COE), Norovirus Laboratory Surveillance Network (CaliciNet), and Norovirus Sentinel Testing and Tracking (NoroSTAT).
	• Develop and implement better tools for collecting and analyzing public health surveillance and outbreak-associated information.
	• Improve and standardize laboratory testing methods of clinical specimens for foodborne illness pathogens, including resources to develop new testing methods.
	• Provide training in epidemiologic and environmental health investigation and laboratory methods related to human enteric disease surveillance as mandated by the Food Safety Modernization Act *(3)* through the Centers of Excellence and under other longstanding CDC roles.
	• Conduct outbreak investigations:
	  ○ Provide clinical, epidemiologic, and laboratory expertise in pathogens of public health importance; epidemiologic and environmental health expertise to assist with cluster evaluation and outbreak investigations; expertise in water systems and large-volume water sample collection.
	  ○ Provide leadership, coordination, logistical support, surge capacity, and centralized data collection and analysis for multistate outbreaks.
	  ○ Coordinate communication with collaborating state and local agencies, other federal agencies, and international partners.
	  ○ Provide advanced laboratory testing of clinical specimens (and occasionally consumer-held food products), including identification of new or rare disease agents.
	• Lead after-action review of human health investigation component of multistate outbreak investigations.

3.1 Roles

Table 3.3. Examples of Typical Foodborne Outbreak Investigation Roles, Responsibilities, and Contributions of Cross-Agency Programs

PROGRAM	ROLES, RESPONSIBILITIES, RESOURCES, AND CONTRIBUTION

Rapid Response Teams (RRT)	Responsible for implementing partnership between the Food and Drug Administration (FDA) and state programs to build food safety infrastructure and integrated rapid response for all-hazards human and animal food emergencies:
	• Maintain and promote RRT Best Practices Manual (*4*)
	  ○ Food outbreak and all-hazard human and animal food emergency response procedures, specific disease agents, epidemiologic and environmental outbreak investigation, informational traceback and implicated product traceforward.
	  ○ Collection of environmental and food samples for chemical, radiologic, physical, and microbial contaminant analysis.
	• Provide training in outbreak response methods for local health agencies.
	• Conduct outbreak investigations. The RRT serves as the Outbreak Investigation and Control Team for multijurisdictional and state-level outbreaks:
	  ○ Lead, assist, and support investigations conducting facility inspections; informational traceback investigations; and food recalls that involve food products (manufactured, commercially produced, and retail) through consultation with health department investigators, federal food safety agency partners, and food industry firms.
	  ○ Initiate chain-of-custody, quality assurance, and safety procedures when collecting and submitting food samples to support regulatory response.

Food Emergency Response Network	Responsible for prevention, preparedness, response, and recovery activities (*5*): • Maintain an integrated network of local, state, and federal laboratories across the United States that are capable of rapid response to food-related emergencies and attacks on the U.S. food supply. • Detect and identify biological, chemical, and radiologic agents in food, and provide food testing surge capacity during national emergencies.

Table 3.4. Examples of Typical Foodborne Outbreak Investigation Roles, Responsibilities, and Contributions of Nongovernment, Industry, and Academic Partners

PARTNER	ROLES, RESPONSIBILITIES, AND CONTRIBUTIONS

Healthcare Providers	Responsible for appropriate testing, provision of patient care, and reporting of required illnesses and conditions:
	• Maintain supplies (specimen collection kits) and trained staff to support outbreak investigations.
	• Speed detection, investigation, and control of foodborne illness outbreaks by
	  ○ Gathering of preliminary exposure and clinical history.
	  ○ Early recognition and reporting of possible outbreaks.
	  ○ Timely collection and submission of appropriate specimens for testing.
	  ○ Application of infection control measures.
	• Provide appropriate patient education and information to prevent further spread of disease.

3.1 Roles

Table 3.4. Examples of Typical Foodborne Outbreak Investigation Roles, Responsibilities, and Contributions of Nongovernment, Industry, and Academic Partners *Continued*

PARTNER	ROLES, RESPONSIBILITIES, AND CONTRIBUTIONS

Industry*	Responsible for maintaining the safety of food offered to the public:
	• Firm Level: A specific point of sale, distributor, manufacturer, processor, or farm that is directly impacted by an ongoing outbreak investigation.
	  ○ Have detailed knowledge about the firm's processes and organizational culture that are key to understanding possible
	  ▪ Point(s) of contamination.
	  ▪ Contributing factors.
	  ▪ Underlying environmental root cause(s) (i.e., antecedent[s], underlying reason[s]) that lead to outbreaks.
	  ○ Communicate with employees, suppliers, government agencies, and customers during outbreaks.
	  ○ Implement control measures that can stop the current outbreak and prevent reoccurrence.
	  ▪ Firm level controls, e.g., employee restrictions/exclusion, food process changes.
	  ▪ In-distribution controls: cease distribution and initiate recalls
	  See CIFOR Industry Guidelines for further details relevant to the food service and retail food sectors (https://cifor.us/products/industry).
	• Commodity-Specific and Regional Levels: Groups and associations focused on a specific commodity or product
	  ○ Can provide expertise on how the commodities or products are grown, processed, manufactured, packed, distributed, and served.
	  ○ Discussions with this level of industry can help investigators better understand how to investigate contamination issues.
	  ○ Have preexisting networks that can be used to
	  ▪ Gather and provide information needed during the investigation.
	  ▪ Communicate the findings of outbreak investigations to relevant individuals and entities.
	  ▪ Build consensus regarding changes needed to protect public health and consumer confidence in their products.
	• National Level: Groups and associations that represent many food-related entities at the national level:
	  ○ Can provide expertise on how a range of food products are grown, processed, manufactured, packed, distributed, and served.
	  ○ Ongoing collaboration and partnership with these groups is important for changes to laws, regulations, policies, and initiatives that impact industries nationally.

Academic centers	Responsible for providing technical assistance, training, and specialized laboratory support: • Publish research results to help inform future outbreak investigations and implement control measures (e.g., NoroCORE) (*6*). • Conduct special laboratory analyses or provide additional resources. • Conduct applied food safety research to expand results of investigations.

* Partnerships with individuals and entities at each level should be well-established, and discussions should be ongoing, not occur just during an outbreak crisis.

3.2 Outbreak Investigation and Control Team

The responsibility for investigating foodborne illness outbreaks and implementing control measures rests on a team of people who each contribute different knowledge and skills. Depending on the size and scope of the investigation, the size of the team varies from a few people to hundreds. In smaller investigations, individuals may fulfill multiple roles concurrently. Regardless of the size or complexity of an individual investigation, investigation and control teams must be able to synthesize information from a variety of sources as they investigate individual cases, clusters, and outbreaks.

Job titles alone might not accurately indicate who does what. Team members' assigned tasks and their knowledge and skills define their roles. Members may come from different programs within an agency or from different agencies. Composition of the outbreak investigation and control team varies depending on the specifics of the outbreak. In many investigations, roles are defined relatively informally and may change as the investigation unfolds. In other investigations, roles are mapped to the formal structure of the National Incident Management System, which government agencies and Rapid Response Teams use (see Section 7.2.3 for specifics about the National Incident Management System and Incident Command System [ICS]) (*7*). The composition of core outbreak investigation and control team should be determined before any outbreaks.

3.2.1 A core team should be involved in all outbreak investigation and control efforts, giving consistency to investigations, serving as the focal point for coordinating multidisciplinary and/or multiagency tasks, and enabling development of effective working relationships with external partners and advanced expertise among staff. The approach for structuring an investigation and control team will not look the same for all agencies. In small agencies with limited outbreaks, this might be accomplished by designating a few people who receive outbreak response training. In large agencies responding to more frequent and/or complex outbreaks, this might be a dedicated outbreak response team of epidemiologists, environmental health specialist, environmental scientists, and laboratorians who train and work together.

- ***Team leader:*** Sets and enforces priorities; coordinates all activities associated with the investigation; serves as the point of contact about the investigation; coordinates content of messages to the public through the public information officer; communicates with other organizations involved in the investigation; communicates recommended course of action determined by team to agency decision-makers.
- ***Epidemiologist:*** Identifies and interviews case-patients; develops hypotheses and strategies to test them; plans epidemiologic studies; re-interviews case-patients and healthy controls; provides insights and guidance to environmental health specialists (and federal regulatory partners) on cases and clusters for informational traceback, collects and analyzes investigation data using statistical analyses or collaborating with a statistician; reports results; collects clinical specimens; coordinates testing of clinical specimens and environmental samples; consults and coordinates with environmental and laboratory investigators.
- ***Environmental health specialist:*** Investigates food preparation sites across the food chain; reviews food inventory and food distribution records for informational traceback investigations in epidemiologic studies; collects environmental and food samples, maintaining chain-of-custody and coordinates testing with laboratorian; interviews food workers and managers; reviews food preparation and food

3.2 Outbreak Investigation and Control Team

handling records; observes and maps food flow, reviews firm's inspectional and enforcement records for prior food safety history; conducts environmental health assessments to determine contributing factors and environmental root causes (i.e., antecedent[s], underlying reason[s]).

- ***Laboratorian:*** Analyzes clinical specimens, food and environmental samples (depending on the state, the food and environmental samples may be tested in different laboratories than the clinical specimens); interprets test results and suggests follow-up testing; reports results; coordinates testing among laboratories; advises other team members about sampling requirements and testing, including collection, handling, storage, and transport of specimens; communicates laboratory testing methods and results and the maintenance of chain-of-custody to FSIS and FDA investigators or other food regulatory agency gathering evidence of food product adulteration.
- ***Public information officer:*** Develops general and specific messages for the public through the media; responds to media inquiries or identifies the appropriate spokesperson; coordinates communication with multiple agencies; disseminates information about outbreak status and overall policies, goals, and objectives to widespread and diverse audiences that include the executive and legislative branches of the government; local governments; the general public; and the local, state, and national news media.

Additional team members with other expertise may be needed, depending on the unique characteristics of the illness or outbreak.

3.2.2 Team members should have the expertise and training needed to competently fulfill assigned responsibilities and tasks for the types of outbreaks they will be expected to investigate and control.

They should understand the roles of the other team members, be able to recognize when an outbreak response exceeds agency resources, and know how to expand the investigation team and request additional resources when needed. Training and procedures should anticipate and address how response team members will manage increased coordination and communication workloads when outbreak investigations rapidly escalate. Ongoing training is critical for all members of the outbreak investigation and control team to ensure they are proficient at performing their assigned duties.

At a minimum, the outbreak investigation and control team should have training in specific protocols for routinely assigned tasks. The training should include continuing education to maintain and improve skills within their specialty and specific training in the agency's outbreak response protocols and the member's role on the team.

For a smaller agency with a limited number of outbreak investigations, special training opportunities should be arranged. Consider the use of webinar technology where little or no opportunity exists for travel. The CDC-supported Integrated Food Safety Centers of Excellence have approximately 150 tools and training courses available online at no charge (CoEFoodSafetyTools.org).

- Ensure all team members have a common understanding of the primary goal for outbreak response, which is to implement control measures as quickly as possible to prevent additional illness.
- Provide team members with continuing education and training opportunities, including cross-training/joint training.
- Conduct regional training with multiple agencies, including tabletop exercises. Such training can help identify problems that might arise during a multijurisdictional outbreak.

3.2 Outbreak Investigation and Control Team

- Offer just-in-time training to refresh the knowledge and skills of staff who do not routinely perform assigned tasks.
- Identify opportunities to collaborate with representatives of the food industry in training exercises, to foster understanding and develop communication strategies that can help streamline actual outbreak investigations.
- Use outbreak investigations as training opportunities to develop individual and organizational skills.

3.3 Planning to Rapidly Expand and Contract Investigation and Control Team Structure

Agency plans must anticipate the need to rapidly expand and contract the size and structure of investigation and control teams to address changing conditions, including to participate in multiagency investigation and control teams (Chapter 7).

3.3.1 The following practices can be used to scale up (escalate) and down (de-escalate) investigation and control teams to meet the often rapidly changing needs of an outbreak response.

- Ensure foodborne outbreak investigation team plans and procedures are updated regularly.
- Determine jurisdiction; investigations may require management in multiple jurisdictions.
- Identify criteria (triggers) used to indicate when the needs of investigation and control teams exceed agency resources, such as
  - Size of the outbreak.
  - Likelihood that resources will be exceeded.
  - New or rapidly emerging incident.
  - Long duration of incident.
- Identify resources that can be tapped for surge, and develop relationships and plans to facilitate quick access to these resources should the need arise. For example:
  - Cross-train persons from within the agency or from other organizations—such as other branches of government, university students, volunteers (e.g., Medical Reserve Corps)—who have adequate skills or knowledge and would be willing to help conduct interviews or provide other support during a large-scale outbreak.
  - Establish Memorandums of Understanding, Mutual Aid, or other agreements along with plans, procedures, communication strategies, and protocols before a foodborne illness outbreak.
  - Consider using ICS principles and organizational structures, as appropriate, to manage outbreak responses—especially those that cannot effectively be managed using the agency's standard operating procedures and chain of command.

3.3.2 Agencies involved in foodborne illness outbreak investigation and response should decide in advance whether and how to apply an ICS and, if applicable, incorporate the ICS into their response planning. Such planning should be coordinated with all other agencies that may be drawn into the investigation and response over time. Many foodborne illness outbreak investigations do not require formal activation of ICS, but outbreak investigation and control teams will benefit from training in ICS principles and methods (Chapter 7).

3.4 Response Resources

A critical aspect of preparing to investigate a foodborne illness outbreak is assembling the necessary resources; supplies, equipment, people, and outbreak investigation–related documents (some accessible via reference materials or pertinent databases) to ensure that everything needed in the investigation and response is quickly available. This enables the outbreak investigation and control team to move rapidly into the field.

3.4.1 Identify staff to support the Outbreak Investigation Team.

- ***Administrative staff:*** Support personnel to make phone calls, answer incoming calls from concerned members of the public, assist in travel arrangements and other logistics, enter data into a database, copy paperwork, and other administrative work.
- ***Executive and financial staff:*** Executive staff to guide response priorities and objectives, facilitate communication and role changes, and financial staff to release funds, track expenditures, and assist in procurement of supplies and equipment.
- ***Legal counsel***

3.4.2 Develop field investigation or "go" kits for environmental health investigators, including sampling utensils, thermometers, fecal collection kits, and appropriate forms (Box 3.1.). Ensure that relevant field investigators have access to these kits and are aware of where they are located and that the kits are available at all times. Foodborne illness outbreak investigation kits should be maintained in ready-to-use condition, with sterile sampling supplies, containers and implements. Establish, maintain, and review or verify inventory regularly. (Detailed information about kits and sample lists are included at the CIFOR Clearinghouse, https://www.cifor.us/clearinghouse and in the International

Box 3.1. Example Supplies for Outbreak Field Investigation Go-Kits

- Personal protective equipment to ensure safety and aseptic sampling techniques.
- Sterile and wrapped sample-collection supplies (e.g., gloves, spoons, scoops, tongue- depressor blades, spatulas, spongesticks, swabs, knives).
- Sterile sample containers (e.g., plastic bags, wide-mouth plastic and glass jars with screw caps, bottles, sterile sampling bags) and mailing instructions.
- Sterile fecal sample kits for food workers or case-patients.
- Sterilizing and sanitizing agents (e.g., 95% ethyl alcohol, sodium or calcium hypochlorite, alcohol swabs), hand sanitizers, and sanitizer test strips.
- Equipment to determine food characteristics (e.g., pH, water activity, sugar content).
- Temperature-checking probes and backups.
- Refrigerants (e.g., ice packs), insulated containers.
- Labeling and sealing equipment (e.g., fine-point or felt-tip permanent marking pen, roll of adhesive or masking tape, waterproof labels or tags, custody tape).
- Shipping boxes/coolers, prepaid shipping labels, and forms.
- Forms, including sample collection and blank laboratory submission forms, chain-of-custody and other forms for documenting activities.
- Camera or other method to visually document the investigation.
- Trash bags for the waste generated during the investigation (always take your trash with you).

3.4 Response Resources

Association for Food Protection *Procedures to Investigate Foodborne Illness* (http://www.foodprotection.org/publications/other-publications/). Procedures for routinely reviewing and replacing missing or outdated supplies and equipment should be part of an agency's outbreak response protocol.

In addition to the sampling supplies, ensure that staff have access to cellular telephones, two-way radios and other team communication devices appropriate to the response situation, including

- Capabilities and equipment for conference calls.
- Multiple phone lines.
- Computers, laptops, software (e.g., data entry, statistical), extension cords, multioutlet power strip surge protector, portable printers, paper, graph paper, pens, clipboards, camera.

3.4.3 Make sure investigation and control team members have access to necessary documents and forms and be trained to use them appropriately in a response situation. These include

- Chain-of-custody forms.
- Foodborne illness complaint worksheets.
- Blank disease-specific case report forms.
- Laboratory test requisition forms.
- Standardized outbreak questionnaires (available at https://www.cdc.gov/foodsafety/outbreaks/surveillance-reporting/investigation-toolkit.html).
- Environmental health assessment forms, such as hand hygiene assessment (examples available at https://www.cdc.gov/nceh/ehs/EHSNet).
- Shipping protocols, forms and required prepaid labels

These and other sample documents are available from the CIFOR Clearinghouse at https://cifor.us/clearinghouse.

3.4.4 Team members must have access and are trained (if applicable) to use key databases, communication platforms, and other resources before an outbreak. Although not exhaustive, the following databases, listservs, and other systems are recommended:

- CDC Foodborne Outbreak listserv.
- PulseNet SharePoint website.
- System for Enteric Disease Response, Investigation, and Coordination (SEDRIC).
- NCBI Pipeline.

3.4.5 Assemble a reference library (including online resources) with information about foodborne illnesses, enteric illnesses, and control measures. Where possible, include electronic resources that can be accessed by laptop computers or mobile devices during field investigations. Regularly review and update the contents of this reference library.

- Books, Web resources for support during outbreak (e.g., CDC's Diseases and Conditions A–Z index, FDA's Bad Bug Book).
- Latest version of the American Public Health Association's *Control of Communicable Diseases Manual (8)*.
- *Procedures to Investigate Foodborne Illness* by the International Association for Food Protection (*9*).
- *Investigating Foodborne Disease Outbreaks* by the World Health Organization (*10*).
- FDA's *Investigations Operations Manual* (*11*).

3.4 Response Resources

FSIS online resources

- Template for Including FSIS in Foodborne Illness Outbreak Response Procedures: www.fsis.usda.gov/OutbreakProcedures.
- Information Helpful to FSIS During Foodborne Illness Investigations: www.fsis.usda.gov/InvestigationInfo.
- Resources for Public Health Partners: Foodborne Illness Investigation: www.fsis.usda.gov/PHPartners.
- Integrated Food Safety Centers of Excellence all products website: https://coefoodsafetytools.org/AllCoEProducts.aspx.
- CIFOR Guidelines: https://cifor.us/products/guidelines.

3.5 Communication Plans

Good communication is one of the most important factors in successful outbreak investigation and control. At all points in the outbreak continuum—from detection through investigation and response to debriefing—communication is critical. Without it, investigations and responses can be delayed, uncoordinated, and ineffective. Furthermore, good communication can help allay agency management and public concerns and improve industry support for actions to control outbreaks. To promote better outcomes, use the time before and between outbreaks to lay the groundwork for communication, such as developing and updating contact lists, defining communication processes, establishing relationships with key persons internal and external to the agency, and determining how confidential information will be stored, and whether and how it can be shared.

Although the following practices for communication are all recommended, full implementation may not be possible in some jurisdictions because of resource limitation. Implementing as many as possible as completely as possible will improve communication.

3.5.1 Prepare a list of people in the agency who should be contacted in the event of an outbreak, including backups, and contact people in external agencies (adjacent local, territorial, state, tribal, and federal agencies). Ensure the list includes after-hours and weekend contact information, and update it regularly.

Assemble a contact list of resource persons who have expertise in specific disease agents and investigation methods with primary phone numbers and alternates, cell phone numbers, 24-hour numbers, home phone numbers, email, fax numbers, and addresses) of

- Core members of the outbreak investigation and control team.
- Other officials inside the agency, such as the chief of the epidemiology unit, director of the public health laboratory, director of environmental health, public health information officer, and the agency director.
- Critical contacts in other government agencies.
- Important food industry contacts, including trade associations (e.g., National Restaurant Association).
- Key healthcare provider contacts.
- Laboratory contacts.
- Primary media contacts.

3.5 Communication Plans

3.5.2 Define a formal communication process for the outbreak investigation and control team to use during outbreaks. Anticipate what information and data response partners and agency leadership need, and at what frequency, to maintain situational awareness and guide decision-making about investigation and control measures. Options include daily meetings, daily phone calls, and email updates. Developing a consistent approach to internal communications during an outbreak helps everyone on the team know what to expect.

- Identify the persons responsible for communication on behalf of their organizational unit (epidemiology, environmental health, laboratory) and for the outbreak investigation and control team. Communicators must be brought in early as the outbreak develops for a more efficient response.
- Determine how nonpublic information will be saved and whether and how it can be shared. Local and state agencies can receive certain types of confidential information from FDA under a 20.88 information sharing agreement (*12,13*) (Chapter 7.3).
- Distribute a list of the agency's contacts to other agencies, and obtain their contacts.
- Establish processes for participating in multiagency, multijurisdictional conference calls, and train staff in appropriate conference call etiquette.
- Establish procedures for coordinating communication with the following entities to provide consistent messaging and accurate information flow:
  - Local, state, and federal authorities.
  - Local organizations, food industry, and other professional groups (including healthcare providers).
  - The public.
  - The media.
- Create templates for communications with the public (e.g., press releases, fact sheets), focusing on the most common foodborne illnesses. Sample materials are available at the CIFOR Clearinghouse (https://www.cifor.us/clearinghouse).
- Create and test online tools to communicate with the public (e.g., blast emails, surveys, social media).
- Guide staff on how to respond to and communicate during conflict situations, such as with upset food service workers, food protection managers, and members of the public.
- Identify people with clinical training, such as public health nurses or medical epidemiologists, to communicate with case-patients about the outbreak and actions they should take to protect their health and their family's health.
- Identify a person from an agency to talk to the media, ideally someone trained in media relations or a public information officer. Establish procedures for coordinating communication with the media to provide consistent messaging and accurate information flow.

3.6 Planning for Recovery and Follow-Up

Part of preparing for outbreak response is planning for the recovery and follow-up stages. This planning helps ensure appropriate actions are taken after each outbreak and helps identify and correct problems to prevent future outbreaks from the same causes. Establish a process to conduct hot-washes so participants can provide feedback. Create after-action reports that identify lessons learned and action items for follow-up, including ways to improve. Report the root cause(s) of the outbreak and other key investigation findings to national foodborne outbreak and response databases, such as the National Outbreak Reporting System and the National Environmental Assessment. Reporting System (Chapter 6).

References

1 Food and Drug Administration. FDA Food Code. https://www.fda.gov/food/guidanceregulation/retailfoodprotection/foodcode/default.htm

2 Food and Drug Administration. About the CORE Network. https://www.fda.gov/food/outbreaks-foodborne-illness/about-core-network

3 Food Safety Modernization Act. Pub. L. No. 111–353, 124 Stat. 3885 (2011).

4 Association of Food and Drug Officials. RRT best practices manual (November 2017 edition). http://www.afdo.org/RRT-Manual

5 Food Emergency Response Network. https://www.fernlab.org

6 USDA National Institute of Food and Agriculture. NoroCORE: a comprehensive approach to a near 'perfect' human pathogen. https://nifa.usda.gov/blog/norocore-comprehensive-approach-near-perfect-human-pathogen

7 Qureshi K, Gebbie KM, Gebbie EN. Implementing ICS within public health agencies. https://ualbanycphp.org/pinata/phics/guide/default.cfm

8 American Public Health Association. Control of communicable diseases manual. https://ccdm.aphapublications.org/doi/book/10.2105/CCDM.2745

9 International Association for Food Protection. IAFP procedures to investigate foodborne illness. Revised. https://www.foodprotection.org/about/news-releases/iafp-procedures-to-investigate-foodborne-illness-revised

10 World Health Organization. Foodborne disease outbreaks: guidelines for investigation and control. https://apps.who.int/iris/handle/10665/43771

11 Food and Drug Administration. Investigations Operations Manual. https://www.fda.gov/inspections-compliance-enforcement-and-criminal-investigations/inspection-references/investigations-operations-manual

12 21 C.F.R. 20.88.

13 Food and Drug Administration. Information sharing. https://www.fda.gov/ForFederalStateandLocalOfficials/CommunicationsOutreach/ucm472936.htm

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Resources (current as of August 8, 2019)

Academia

- Colorado Integrated Food Safety Center of Excellence: https://www.cdc.gov/foodsafety/centers/sites/colorado.html
- Minnesota Integrated Food Safety Center of Excellence: https://www.cdc.gov/foodsafety/centers/sites/minnesota.html
- New York Integrated Food Safety Center of Excellence: https://www.cdc.gov/foodsafety/centers/sites/newyork.html
- Tennessee Integrated Food Safety Center of Excellence: https://www.cdc.gov/foodsafety/centers/sites/tennessee.html
- Cornell Department of Food Science: https://foodscience.cals.cornell.edu
- Washington Integrated Food Safety Center of Excellence: https://www.cdc.gov/foodsafety/centers/washington.html
- American Public Health Laboratories

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Federal Government

- U.S. Department of Agriculture, Food Safety and Inspection Service: https://www.fsis.usda.gov/wps/portal/fsis/home
- FoodSafety.gov: http://www.foodsafety.gov

Centers for Disease Control and Prevention

- Index for Foodborne Illness: https://www.cdc.gov/foodsafety/diseases/index.html
- List of Selected Multistate Foodborne Outbreak Investigations: http://www.cdc.gov/foodsafety/outbreaks/multistate-outbreaks/outbreaks-list.html
- Foodborne Diseases Active Surveillance Network (FoodNet): http://www.cdc.gov/foodnet/index.html
- The National Molecular Subtyping Network for Foodborne Disease Surveillance (PulseNet): https://www.cdc.gov/pulsenet/index.html
- CDC Division of Food, Waterborne and Environmental Diseases: http://www.cdc.gov/ncezid/dfwed/
- Foodborne Disease Outbreak Surveillance System (FDOSS): https://www.cdc.gov/fdoss/index.html
- National Outbreak Reporting System (NORS): https://www.cdc.gov/nors/index.html
- System for Enteric Disease Response, Investigation, and Coordination (SEDRIC): https://www.cdc.gov/foodsafety/outbreaks/investigating-outbreaks/sedric.html
- CDC Vital Signs: https://www.cdc.gov/vitalsigns/
- CDC Zoonotic Diseases: http://www.cdc.gov/zoonotic/gi/index.html
- CDC Foodborne Outbreak Team: http://www.cdc.gov/ncezid/dfwed/orpb/ort.html
- Salmonella Reporting Timeline: http://www.cdc.gov/salmonella/reportingtimeline.html
- National Antibiotic Resistance Monitoring System for Enteric Bacteria (NARMS): https://www.cdc.gov/narms/index.html
- Norovirus information: http://www.cdc.gov/norovirus/index.html
- Burden of Foodborne Illness: Findings: http://www.cdc.gov/foodborneburden/2011-foodborne-estimates.html
- National Environmental Assessment Reporting System (NEARS) (https://www.cdc.gov/nceh/ehs/nears/index.htm) Integrated Food Safety Centers of Excellence: https://www.cdc.gov/foodsafety/centers/index.html

Food and Drug Administration

- FDA Investigations Operation Manual: https://www.fda.gov/iceci/inspections/iom/default.htm
- FDA Rapid Response Team Links: RRT Best Practices Manual (Edition 2017): http://www.afdo.org/RRT-Manual
- Best Practices for Improving FDA State Communications Recalls (Summer 2015): https://www.fda.gov/downloads/ForFederalStateandLocalOfficials/ProgramsInitiatives/PartnershipforFoodProtectionPFP/UCM460013.pdf
- Best Practices for Use of FoodSHIELD During Food and Feed Incidents (Summer 2015): https://www.fda.gov/downloads/ForFederalStateandLocalOfficials/ProgramsInitiatives/PartnershipforFoodProtectionPFP/UCM524721.pdf
- National Program Standards Crosswalk Resource Paper (September 2013): https://www.fda.gov/downloads/ForFederalStateandLocalOfficials/ProgramsInitiatives/PartnershipforFoodProtectionPFP/UCM404725.pdf
- Model for Local Federal/State Planning and Coordination of Field Operations and Training (October 2013): https://www.fda.gov/downloads/ForFederalStateandLocalOfficials/ProgramsInitiatives/PartnershipforFoodProtectionPFP/UCM404722.pdf
- Food/Feed Testing Laboratories Best Practices Manual—Draft (December 2013): https://www.fda.gov/downloads/ForFederalStateandLocalOfficials/ProgramsInitiatives/PartnershipforFoodProtectionPFP/UCM404716.pdf
- Quick Start Food Emergency Response Job Aids (Winter 2017): https://www.fda.gov/downloads/ForFederalStateandLocalOfficials/ProgramsInitiatives/PartnershipforFoodProtectionPFP/UCM535097.pdf

Other Organizations

- Association of Public Health Laboratories
  - APHL and Food Safety: https://www.aphl.org/programs/food_safety/Pages/APHL-Food-Safety.aspx
  - Food Safety Tools and Resources: https://www.aphl.org/programs/food_safety/Pages/Food-Safety-Tools-and-Resources.aspx
  - Food Safety: https://www.aphl.org/programs/food_safety/Pages/default.aspx

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- Association of Food and Drug Officials: http://www.afdo.org
- Association of State and Territorial Health Officials: https://www.astho.org
- Council of State and Territorial Epidemiologists: http://www.cste.org
- International Association for Food Protection: https://www.foodprotection.org
- International Food Protection Training Institute: https://ifpti.org
- National Association of County and City Health Officials: https://www.naccho.org
- National Association of State Departments of Agriculture: https://www.nasda.org
- National Association of State Public Health Veterinarians: http://www.nasphv.org
- National Environmental Health Association: https://www.neha.org