CHAPTER

3

Planning and Preparation

The primary goal of a foodborne disease outbreak investigation is to identify the processes that led to food contamination or pathogen transmission and to implement control measures as quickly as possible to halt transmission of illness. Another goal is to understand the reasons for the outbreak well enough to prevent similar outbreaks. Good planning and preparation, including the right expertise in the investigation and rapidly sharing investigation findings can accomplish these goals.

The early days of an investigation are critical. Ideally an agency should always be prepared for an investigation so it will spend as little time as possible getting organized once an outbreak is identified. This chapter describes the roles of the major organizations involved in foodborne disease outbreak response and highlights the resources, processes, and relationships that should be in place before an outbreak.

3.0. Introduction

When a potential foodborne disease outbreak is first detected or reported, investigators will not know whether the disease is foodborne,waterborne, or attributable to other causes. Investigators must keep an open mind in the early stages of the investigation to ensure that potential causes are not prematurely ruled out. Although these Guidelines focus on foodborne disease, the agency roles and responsibilities described in this chapter, and many of the surveillance and detection methods described in Chapter 4 and the investigation methods described in Chapter 5 apply to a variety of enteric and other illnesses, regardless of source of contamination.

3.1. Agency Roles

3.1.1. Overview

A foodborne disease outbreak may be managed solely by a single local agency or may become the shared responsibility of multiple local, state, and federal agencies. The nature of the outbreak, including the type of pathogen, the suspected or implicated vehicle, the number and location of affected persons, the geographic jurisdictions involved and the local and state food-safety rules and laws will determine the types of agencies that need to be involved. Outbreak response will also be influenced by agencies' roles and responsibilities and typically available resources. Each agency's response plan should include its likely role in a foodborne disease 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.

3.1.2. Local, State, and Federal Agencies

Across the country, state and local agencies differ widely in their organizational structure, responsibilities and relationships. The sections below summarize typical responsibilities for agencies at the local and state levels. However, assignment of those responsibilities will vary depending on a particular state's organizational, legal, and regulatory structure; the distribution of responsibilities across different types of state and local agencies; and the size and capacity of the local agencies.

3.1.2.1. Local health agencies

- Roles and responsibilities
  Conduct surveillance; receive complaints about potential foodborne diseases; maintain and routinely review log of complaints; routinely communicate with local health-care professionals; regulate food-service operations; routinely inspect food-service operations; investigate complaints; implement control measures to stop outbreaks; educate food workers on preventing outbreaks of foodborne disease; inform the public and the media; serve as liaison with local industry representatives and with the state and federal public health and food-safety regulatory agencies. May also provide advanced laboratory testing, including subtyping, such as molecular fingerprinting in PulseNet.
- Resources
  Vary by agency but may include expertise in epidemiologic and environmental outbreak investigation and response; and health information and promotion information for dissemination to the public. Extensive knowledge of local populations and community businesses, health-care providers and organizations, and other resources.
- Contribution to outbreak investigation and response
  Detect foodborne diseases; identify local outbreaks; know about suspected facilities

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(e.g., facility inspection reports, previous complaints); support recall efforts; know affected communities; know local health-care professionals and diagnostic practices.

3.1.2.2. State agencies—health department

- Roles and responsibilities
  Conduct surveillance; identify local and statewide outbreaks; coordinate multijurisdictional outbreaks; provide advanced laboratory testing, including molecular fingerprinting in PulseNet; support or direct environmental, laboratory, and epidemiologic investigations with advanced expertise; provide health education and promotion materials; maintain tools for collecting and analyzing outbreak-associated information; provide public information; provide legal support for outbreak investigation and control; promote statewide policies to increase food safety; serve as liaison and coordinate communication with other state, local, and federal agencies; disseminate information to local agencies. May conduct investigations in local areas were there is no local health agency with jurisdiction.
- Resources
  Expertise in epidemiologic and environmental outbreak investigation and response (including traceback investigations); expertise in specific disease agents; advanced laboratory testing with expertise in microbial analyses and identification through their state laboratories; tools for collecting and analyzing outbreak-associated information; health information and promotion information (often in multiple languages) for dissemination to the public; additional staff to aid in outbreak investigations.
- Contribution to outbreak investigation and response
  Epidemiologic, environmental, and laboratory support for local health agencies; coordination of multijurisdictional outbreaks.

3.1.2.3. State agencies—environmental conservation or quality

Note: these roles may be carried out by agencies with different names, including environmental health.

- Roles and responsibilities
  Support or direct environmental testing; provide advanced laboratory testing of food or environmental samples; provide educational materials and public information about environmental and food safety; maintain tools for collecting and analyzing outbreak-associated information; promote statewide policies to increase food and environmental safety; serve as liaison with other state, local, and federal agencies; disseminate information to local agencies.
- Resources
  Expertise in environmental and food-safety investigation and response; advanced laboratory testing with expertise in microbial analyses and identification; additional staff to aid in outbreak investigations.
- Contribution to outbreak investigation and response
  Environmental investigation and laboratory support for local health agencies.

3.1.2.4. State agencies—food-safety regulatory authorities

Note: these roles may be carried out by agencies with different names, including Department of Agriculture, Food Protection, or Environmental Health.

- Roles and responsibilities
  Ensure good manufacturing practices in commercial food operations; test dairy, meat, and food products for microbial contamination; inspect plant after an outbreak; coordinate food recalls carried out by industry; and stop sales of adulterated product within their jurisdiction. Conduct regulatory sanitation inspections at retail establishments such as grocery stores, supermarkets and warehouses. Consult with health departments in outbreak

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investigations (e.g., with knowledge of food production and distribution and information provided by industry that may contribute to the success of the investigations) and to direct plant inspections by thoroughly understanding the epidemiologic, environmental, and laboratory data.

- Resources
  Expertise in food manufacturing and distribution; staff to conduct plant inspections and specialized testing of dairy, meat, and food products; expertise in regulatory tracebacks. Laboratory support, usually involving surveillance for food adulterants, including chemical, physical, and microbiologic adulterants and contaminants.
- Contribution to outbreak investigation and response
  Support investigations that involve commercially distributed food products through consultation with health department investigators, plant inspections, traceback investigations, and food recalls.

3.1.2.5. Federal agencies—Centers for Disease Control and Prevention

- Roles and responsibilities
  Conducts or coordinates national surveillance for illnesses caused by pathogens commonly transmitted through food and for outbreaks of foodborne diseases of any cause; leads and supports the national surveillance networks, Public Health Laboratory Information System (PHLIS), Foodnet, PulseNet, EHS-Net, and CDC's electronic Foodborne Outbreak Reporting System (eFORS); maintains clinical, epidemiologic, and laboratory expertise in pathogens of public health importance; develops and implements better tools for public health surveillance; provides consultation, assistance, and leadership in outbreak investigations; improves and standardizes laboratory testing methods for foodborne disease organisms; provides advanced laboratory testing; facilitates coordination among jurisdictions within multijurisdictional outbreaks where appropriate; coordinates communication with other federal agencies; provides training in methods; coordinates and collaborates with international surveillance, communication, and training methods; regulates ships that travel to international ports.
- Resources
  Experts (or trainees) in clinical, epidemiologic, and environmental health aspects to assist with cluster evaluation and outbreak investigations; advanced laboratory capacity (including resources to develop new testing methodologies); surge capacity to assist in large outbreaks; tools for collecting and analyzing outbreak-associated information; training programs; educational materials for the public.
- Contribution to outbreak investigation and response
  Assistance in single jurisdiction outbreaks upon request of the jurisdiction; leadership, coordination, and logistics support and coordination for multijurisdictional outbreaks; centralized data collection and analysis for large multistate outbreaks; assistance in outbreaks from new or rare disease agents or from new modes of transmission of known disease agents; advanced laboratory testing; availability of additional personnel and other resources to aid local and state health agencies; conduit to other federal agencies.

3.1.2.6. Federal agencies—Food and Drug Administration

- Roles and responsibilities
  Regulates the safety of most foods (except meat, poultry, and pasteurized egg products, which are regulated by USDA's Food Safety and Inspection Service [FSIS]); regulates food additives and food labeling for FDA-regulated foods; oversees seafood and juice

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regulations for Hazard Analysis and Critical Control Point; oversees imported food products under FDA jurisdiction; conducts research into foodborne contaminants; inspects food-processing plants; conducts food industry postmarket surveillance and compliance; oversees regulatory traceback investigations and recalls of the food products it regulates; publishes the Food Code; regulates ships that travel interstate such as on rivers and intercoastal waters and trains and buses that travel interstate.

- Resources

  Twenty district offices located in five regions, providing coordination, field investigators, laboratory support, technical consultation, regulatory support, and media relations; policy, technical, and scientific support to foodborne disease outbreak investigations provided by FDA's Center for Food Safety and Applied Nutrition (CFSAN); education materials for the public.

- Contribution to outbreak investigation and response

  Once an FDA-regulated product is strongly suspected as the cause of an outbreak, identification of product source and extent of its distribution; testing of product obtained from commerce or production; traceback and factory investigations; prevention of further exposure to contaminated product; and initiation of regulatory action, including requesting recalls if indicated; assistance to the Federal Bureau of Investigation (FBI) when deliberate contamination of food is suspected by providing technical, investigatory, and laboratory support for FDA-regulated products.

3.1.2.7. Federal agencies—U.S. Department of Agriculture, Food Safety and Inspection Service

- Roles and responsibilities

  Ensures the nation's commercial supply of meat, poultry, and pasteurized egg products is safe, wholesome, and correctly labeled and packaged through a national program of inspection, investigation, and enforcement; provides data analysis, advice, and recommendations on food safety; conducts microbiologic testing of meat and poultry products; responds to foodborne illnesses, intentional food contamination, and major threats to FSIS-regulated products, including overseeing recalls for contaminated meat and poultry products; conducts audits to determine the equivalency of foreign food-safety systems and re-inspecting imported meat, poultry, and egg products; develops public information and education programs for consumers.

- Resources

  Approximately 7600 inspection program personnel in more than 6000 federally regulated establishments nationwide coordinated by 15 district offices; three field laboratories, including the Outbreaks Section of Eastern Laboratory in Athens, Georgia; field investigators with expertise in inspection, traceback, and enforcement; personnel with expertise in food-safety science; educational materials and guidance for consumers.

- Contribution to outbreak investigation and response

  Assistance, traceback coordination, and epidemiologic consultation during investigations involving FSIS-regulated meat, poultry, and egg products; testing of product from commerce or production; ability to take enforcement and regulatory control actions against food manufacturers and distributors; assistance in working with international food manufacturers and distributors; consultation to public health and state agriculture agencies.

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3.1.3. Other Agencies

Outbreaks can occur in facilities or communities managed by agencies that have some level of autonomy and operate their own public health programs. Such agencies include tribes, the military, and the U.S. Department of the Interior (National Park Service [NPS]). Local, state, and federal public health agencies need to understand the jurisdictional issues involved in outbreaks in these settings, these groups' resources, and establishment of relationships with them.

Outbreaks also can be associated with intentional contamination. If that is suspected, the FBI has a role in the investigation.

3.1.3.1. Tribes

- Jurisdiction
  Varies by tribal organization, but in general the tribes have complete sovereignty and are completely autonomous. Investigations may be conducted by tribal health staff, Indian Health Services (IHS) staff, or state or local health departments, but nontribal entities can become involved in an investigation only at the tribe's request. No legal requirement exists for reporting a foodborne disease outbreak to any public health officials. Control measures typically are implemented by IHS staff in cooperation with tribal government but can be implemented only when authorized by tribal government.
- Relationships
  Outbreaks may be detected by IHS staff or by tribal members and reported to IHS. IHS notifies the appropriate state and local health departments. Some tribes also may notify the local or state health department or CDC. State and local health department staff need to develop relationships with IHS public health staff, tribal health staff (if any), and tribal leadership in tribal areas within or adjacent to the public health agency's jurisdiction. During an outbreak, communication should be ongoing not only between state or local health department and IHS but also directly with tribal government. IHS has developed tribal epidemiology centers to provide regional epidemiology capacity for multiple tribes. These centers are run by tribal boards and focus on health issues selected by the boards. They may become involved in outbreak investigations and are a good place to promote routine communication. IHS is a good source of information about coordinating public health issues with tribes.
- Resources for outbreak investigation and response
  IHS has many public health staff, including sanitarians and public health nurses, at clinics on many tribal lands. These staff most likely would handle an outbreak and would request help from IHS, the state, or CDC if needed. Some tribes have public health staff, but most do not have public health laws or capacity to respond to outbreaks.

3.1.3.2. Military

- Jurisdiction
  Autonomous authority over all military bases, facilities (including food-production and food-service facilities and health-care service facilities), and vehicles. The particular branch of the military involved and the U.S. Department of Defense maintain public health responsibility.
- Relationships
  Military public health personnel communicate with local and state health agencies for outbreaks that might involve civilians. Local and state health agencies should establish communication with the public health staff of any military facilities within or adjacent to their jurisdiction before any outbreaks. Other branches of the military and other federal agencies communicate through the Foodborne Outbreak Response Coordinating Group.

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- Resources for outbreak investigation and response

  Military agencies conduct training in food safety and epidemiology; inspect and test food-production and food-processing facilities and delivered food products; and coordinate these programs with other military and federal agencies. Preventive Medicine and Environmental Health Officers in each branch direct and conduct epidemiologic investigations of foodborne disease outbreaks and make recommendations. Veterinary Officers conduct traceback investigations. The Department of Defense has officers trained in public health, environmental health, epidemiology, microbiology, toxicology, pathology, and food technology who can coordinate and support outbreak investigations.

3.1.3.3. National Park Service

- Jurisdiction

  Jurisdiction in National Parks is a function of the legislation designating the specific park. Three types of jurisdiction exist: (a) exclusive federal jurisdiction; (b) concurrent jurisdiction with state and local agencies; and (c) proprietary (owned by the federal government but sometimes operated by local entity and depending on support from local police, fire departments, and others for services).

- Relationships

  Notifies relevant local and state health departments of suspected outbreaks. Notifies appropriate federal agency if commercial product is suspected. Works closely with CDC. Relies on CDC or state health departments for laboratory testing. Local and state health agencies whose jurisdiction contains or is adjacent to a national park should establish communication with the NPS Office of Public Health before any outbreaks. Where appropriate, local and state health departments should include questions about visiting parks when they conduct interviews during an investigation and notify NPS if a park might be involved.

- Resources for outbreak investigation and response

  Epidemiology expertise including a medical epidemiologist in the NPS Office of Public Health; U.S. Public Health Service staff assigned to NPS to conduct investigations (including regional public health consultants based around the country); park rangers who have extensive knowledge of their jurisdiction and the population that visits that jurisdiction; scientists in the NPS system with a wide range of expertise (e.g., veterinarians, water specialists); contractors who run park operations on behalf of NPS.

3.1.3.4. Other federal lands

- Jurisdiction

  NPS jurisdiction is described above. Public health jurisdiction on other types of federal land is not always easy to determine. On many federal lands (e.g., national forests, Bureau of Land Management land), state laws apply, but federal agencies may have overlapping jurisdiction. State laws generally do not apply to federal prisons. Each public health agency that contains federal lands within its jurisdiction should identify the responsible local, state, and federal agencies before an outbreak.

3.1.4. Industry—Food Manufacturers, Distributors, Retailers, and Trade Associations

- Roles and responsibilities

  Growing, raising, processing, manufacturing, packaging, distributing, storing and selling food using practices that protect the public's health; withdrawing or recalling products from the market place when they have been identified as the source of a foodborne disease outbreak; communicating with the public about outbreaks associated with food products.

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- Resources
  Knowledge of and information about product identities, formulations, processing practices and distribution patterns to assist with outbreak hypothesis testing and product/ingredient tracing. Some industry members have expertise in microbiology and food-safety research.
- Contribution to outbreak investigation and response
  Source of information about the products and practices under investigation, including customers that have purchased the products; outbreak hypothesis testing; mechanisms for withdrawing/recalling products from the marketplace.

3.2. Outbreak Investigation and Control Team

3.2.1. Overview

The responsibility for investigating foodborne disease outbreaks and implementing control measures falls 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 1 or 2 to hundreds. In smaller investigations, individuals may wear many hats concurrently. A team is more likely to effectively and efficiently respond to the outbreak if team members combine their strengths and collaborate.

Team members' assigned tasks and their knowledge and skills define their roles. Job titles alone may not accurately indicate who does what. Members may come from different programs within an agency or from different agencies. Membership in the outbreak response team may vary depending on the specifics of the outbreak—for example, different disease organisms or different outbreak settings require different skills or agency associations. In many investigations, roles are defined relatively informally and may change as the investigation unfolds.

The composition of foodborne disease outbreak response teams should be determined before any outbreaks. Team members should be preassigned specific tasks and should receive training if necessary to ensure they know how to carry out those tasks. They also should understand the roles of the other team members.

Most importantly, team members should work closely as a team. Their roles are not mutually exclusive—for example, epidemiologists can help laboratorians; environmental health specialists can help enpidemiologists. Furthermore, the work of 1 team member often builds on the work of others. The team cannot succeed without a strong working relationship and ongoing, effective communication among its members.

3.2.2. Roles of Core Team Member

The same individual(s) may play many of these roles, depending on the size of the investigation.

3.2.2.1. Team leader

- Responsibilities
  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 (PIO); communicates with other organizations involved in the investigation; communicates recommended course of action determined by team to agency decision-makers.
- Desirable skills
  Should include organization of investigation information; general knowledge of all elements of an outbreak investigation and the roles of each team member; specific expertise with outbreak investigation methods and

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with foodborne infections; understanding of roles of all agencies involved in investigation; ability to communicate; leadership skills.

3.2.2.2. Epidemiologic investigator

- Responsibilities

  Identifies cases; develops hypotheses and strategies to test them; interviews both cases and healthy controls; plans epidemiologic studies; collects and analyzes investigation data using statistical analyses or in collaboration with a statistician; reports results; collects clinical specimens; coordinates testing of clinical specimens and environmental samples; consults and coordinates with environmental and laboratory investigators.

- Desirable skills

  Ability to rapidly assess a situation; interpret surveillance information; design epidemiologic studies (e.g., case-control studies, cohort studies, and surveys) and develop questionnaires; conduct epidemiologic studies; conduct interviews, including hypothesis-generating interviews; with assistance from the laboratory investigator, identify appropriate clinical tests for suspected pathogens; and analyze and interpret data using standard epidemiologic methods as defined in the Applied Epidemiology Competencies, including measures of association and tests of statistical significance (www.cste.org).

3.2.2.3. Environmental investigator

- Responsibilities

  Investigates food-preparation sites, including sites involved with growing, raising, processing, manufacturing, packaging, storing, and preparing food; collects environmental and food samples; reports results; arranges for testing of samples; coordinates food sampling, management and testing procedures with laboratory investigator; interviews food workers and managers; reviews food-preparation and food-handling records; reviews food inventory and distribution records, food flow, and contributing factors; consults with epidemiologic and laboratory investigators. May also interview cases, collect stool samples, and conduct traceback investigations.

- Desirable skills

  Ability to investigate food-production and preparation processes; conduct interviews; and collect food and environmental samples. Knowledge about causative agent (e.g., likely sources, optimum growth conditions, inhibitory substances, means of inactivation), factors necessary to cause illness (e.g., infectious dose, portal of entry), and implicated vehicle (e.g., physical and chemical characteristics of the vehicle that might facilitate or inhibit growth, methods of production, processing, and preparation).

3.2.2.4. Laboratory investigator

- Responsibilities

  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 laboratory testing, including collection, handling, storage, and transport of specimens.

- Desirable skills

  Varies with the suspected outbreak agent(s) but may include knowledge of classical or molecular microbiology and organic or inorganic chemistry or radiochemistry. Whether testing food and environmental samples, clinical specimens, or both, the laboratory investigator should be familiar with optimal specimen or sample types and with transport and storage conditions, including chain of custody, testing methodologies, and relevant laboratory-based networks (e.g., PulseNet).

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3.2.2.5. Public information officer

- Responsibilities
  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.
- Desirable skills
  Ability to prepare health education messages and press releases using best practices in health education and risk communications; and speaking and presentation skills. Understanding of mechanisms and protocol for relating to the news media, including press, radio and television. Ability to communicate with a diverse audience with limited scientific knowledge.

3.2.2.6 Additional team members

Additional team members with other expertise may be needed, depending on the unique characteristics of the disease or outbreak. Such individuals, might include public health nurses to assist in conducting interviews; statisticians to assist in designing investigation studies and analyzing data in large or complex outbreaks; health-care providers to discuss laboratory results with patients and to administer treatment and prophylactic medications; and health educators to help craft communications for the public.

3.2.3. Outbreak Investigation and Control Teams—Model Practices

These model practices are all recommended; however, full implementation of all these practices might not be possible in many jurisdictions because of resource limitations and competing priorities. Implementing as many as possible and as completely as possible will improve the effectiveness of outbreak control teams.

3.2.3.1. Emergency response unit

If the population covered is large enough and the number of foodborne disease outbreaks is high enough, consider establishing a dedicated emergency response unit. This team of senior epidemiologists, environmental scientists, and laboratorians can train and work together and respond to all outbreaks, giving consistency to investigations and allowing development of advanced expertise.

3.2.3.2. Additional support for large-scale outbreaks

Some outbreaks are too large for one agency to manage independently. Advance preparations can help mitigate the impact of a large-scale outbreak and ensure effective response.

- Identify individuals within the agency or from other organizations—such as other branches of government, university students, volunteers (e.g., Medical Reserve Corp)—who would have minimal skills or knowledge and would be willing to help conduct interviews or provide other support during a large-scale outbreak.
- Develop a contact list and protocol for contacting these individuals when needed. Ensure the list includes after-hours and weekend contact information, and assign an individual or group to update it regularly.
- Develop training and job description(s) for these individuals. If possible, provide on-the-job training specific to their assigned tasks and their roles in the overall investigation. Such training could occur shortly before performance of the necessary task.

3.2.3.3. Agency-specific response protocol and other resources

At a minimum, the outbreak control team should have been trained in specific

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preidentified protocols. The team also needs access to additional resources that can help answer questions and provide information for decision-making during an outbreak. These protocols and resources should be assembled before an outbreak.

- Prepare a response protocol based on the CIFOR guidelines but customized to the agency's needs with specific information relevant to the agency.
- 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 (state, adjacent local health, and federal agencies). Ensure the list includes after-hours and weekend contact information, and update it regularly.
- Assemble a reference library (including online resources) with information about foodborne diseases, enteric illnesses, and control measures. Where possible include electronic resources that can be accessed by laptop computers during field investigations. Regularly review and update the contents of this reference library.
- Assemble a list of resource persons who have expertise in specific disease agents and investigation methodologies.

3.2.3.4. Training for the team

Ongoing training is critical for members of the outbreak control team. 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 team role. For a larger agency that investigates a large number of outbreaks, this may be on-the-job training. For a smaller agency with a limited number of outbreak investigations, special training opportunities should be arranged.

- 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 illness.
- Provide team members with continuing education and training opportunities.
- Exercise teams together to ensure each team member understands and can perform his or her role according to agency-specific protocols and legal authorities and understands the roles and responsibilities of other team members. These exercises also can identify likely problem areas and gaps in resources.
- Conduct regional training with multiple agencies, including table-top exercises. This can help identify problems that might arise during a multijurisdictional outbreak.
- Make training interesting, covering not just methods and statistics but also outcomes of the people in the outbreak and the investigation.
- Outbreaks themselves provide training opportunities. If an agency does not frequently have outbreaks, team members may be able to assist in responses to outbreaks in other jurisdictions. This can help promote learning and provide valuable insights an agency can use to refine its own protocols.
- Conduct a debriefing following each outbreak to identify lessons learned and refine the agency's response protocols.
- Foodborne disease outbreaks provide a good training ground for any epidemiologic investigation. Involving other agency staff in investigations, even if their regular job is not related to food safety, can both support the current investigation and render these staff better prepared to assist in future investigations.

3.3. Resources

3.3.1. Overview

Part of preparing for investigation of a foodborne disease outbreak is assembling the necessary resources—supplies, equipment, and people—to support the outbreak response team and ensure that everything needed in the investigation and response is quickly available. Having a complete set of supplies and equipment at hand allows the outbreak response team to move rapidly into the field. Having support personnel available ensures that phone calls can be answered and data can be entered quickly into databases for analysis, reducing wasted time. Procedures for routinely reviewing and replacing missing or outdated supplies and equipment should be part of an agency's outbreak response protocol.

3.3.2. Recommended Resources

3.3.2.1. Administrative staff

- Support personnel to make phone calls, answer incoming calls from concerned members of the public, enter data into a database, copy paperwork, and other administrative work.

3.3.2.2. Legal counsel

- Legal counsel to prepare public health orders, review and recommend revisions in agency procedures and control measures, ensure confidentiality of health data, and address legal issues.

3.3.2.3. Equipment

- Sterilization equipment for sample collection tools and temperature probes
- Temperature-checking probes and backups
- Equipment to determine food characteristics (e.g., pH, water content, sugar content)
- Capabilities and equipment for conference calls
- Multiple phone lines
- Computers, laptops, software (e.g., data entry, statistical), portable printers, paper, graph paper, pens, clipboards
- Camera

3.3.2.4. Supplies

Keep food sample containers and investigation equipment and clinical specimen kits, including stool specimen and blood drawing kits, available at all times (Box 3.1). Foodborne disease outbreak investigation kits should be maintained in ready-to-use condition, with sampling containers and implements kept sterile. Establish, maintain, and review or verify inventory regularly (at least twice a year and preferably quarterly), particularly during and after an incident. Replace missing and expired materials and resterilize existing equipment. Detailed information about kits and sample lists are included at the CIFOR Clearinghouse.

Box 3.1. Example supplies for food and water sampling kits

- Sterile sample containers (e.g., plastic bags, wide-mouth plastic and glass jars with screw caps, bottles, whirlpack bags) and mailing instructions
- Sterile and wrapped sample-collection implements (spoons, scoops, tongue-depressor blades, spatulas, swabs, knives)
- Sterilizing and sanitizing agents (e.g., 95% ethyl alcohol, sodium or calcium hypochlorite, alcohol swabs), hand sanitizers, and sanitizer test strips
- Refrigerants (e.g., ice packs), thermometer (0°–220°F), insulated containers
- Labeling and sealing equipment (e.g., fine-point felt-tip marking pen, roll of adhesive or masking tape, waterproof labels or tags, custody tape)
- Forms, including sample collection and blank laboratory submission forms, chain-of-custody and other forms for documenting activities
- Clothing (e.g., disposable plastic gloves, hair restraint, laboratory coat)
- Personal protective equipment (gloves and masks)
- Cell phones or other means to communicate in the field

3.3. Resources

3.3.2.5. Outbreak investigation documents

Note: These and other sample documents are available from the CIFOR Clearinghouse at www.cifor.us.

- Chain-of-custody forms
- Food illness complaint worksheets
- Blank disease-specific case report forms
- Laboratory test requisition forms
- Standardized outbreak questionnaires (available at http://www.cdc.gov/foodborneoutbreaks/standard_ques.htm)
- Environmental assessment forms such as hand hygiene assessment (examples available at http://www.cdc.gov/nceh/ehs/EHSNet/)

3.3.2.6. Reference materials

- Books, Web resources for support during outbreak (e.g., CDC's Diseases and Conditions A–Z index)
- Latest version of the American Public Health Association's *Control of Communicable Diseases Manual*
- *Procedures to Investigate Foodborne Illness*, by the International Association for Food Protection

3.4. Complaint Processing

Establish a formal process for receiving complaints from the public. Use a standard process to collect information, including a standard intake form. Collect as much information as possible at the initial call. If possible, a single person should receive or process all illness complaints so patterns can be identified quickly. Alternatively multiple staff could take the calls using standardized data collection forms, which are then reviewed by one individual. Staff receiving calls and backup staff should be trained to give appropriate instructions to callers about prevention of secondary spread and seeking health-care services. Further detail on complaint processing systems is included in Chapter 4.

3.5. Records Management

3.5.1. Overview

Records management is an important element of successful outbreak investigation and response. Appropriately managed records support the outbreak investigation and response team by giving all team members quick access to needed information. Requiring team members to use standard protocols for collecting and organizing information associated with an outbreak can serve a quality assurance role and help ensure that important investigation and response steps are followed. Finally, maintaining good records for each outbreak can help staff identify what went wrong or worked well during the outbreak and can provide valuable information for improving outbreak investigation and response protocols. All information collected about an outbreak should be organized in an electronic database to allow easy searching and analysis.

3.5.2. Recommended Records Management Practices

3.5.2.1. Information collection and sharing

- Identify standardized forms, including illness complaint forms, disease-specific report

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forms, and trawling interview questionnaires, for recording information about potential cases (examples of such forms are available through the CIFOR Clearinghouse). These forms may need to be modified in response to the specifics of the current outbreak.

- Train staff in the use of standardized forms to ensure proper completion by all members of the investigation team.
- Determine how and what information from forms and questionnaires can be properly and efficiently shared within the investigation team.
- Determine when and how to share outbreak information with the person or organization in charge of the facility implicated in an outbreak.

3.5.2.2. Data tracking and analysis

- Establish an enteric illness log or database to track all illness complaints. A database with templates for rapid data entry and analysis will streamline the data-management process.
- Identify the tools used to analyze outbreak data (e.g., Epi Info, SAS). Ensure staff are trained to use these tools.
- Ensure that appropriate electronic records-management procedures are in place, including routine data backups, off-site redundant storage, and disaster recovery procedures.

3.6. Communication

3.6.1. Overview

Good communication is one of the most important factors in successful outbreak control. At all points in the outbreak continuum—from detection through investigation and response to debriefing—communication is critical. Without good communication, investigations and responses can be delayed, uncoordinated, and ineffective. Furthermore, good communication can help allay public concerns and improve industry support for actions to control outbreaks. To promote better outcomes, the time before and between outbreaks should be used to lay the groundwork for communication. This includes developing and updating contact lists, defining communication processes, and establishing relationships with key individuals both internal and external to your agency.

3.6.2. Communication—Model Practices

Although these model practices for communication are all recommended, full implementation of all of these practices may not be possible in many jurisdictions because of resource limitations and competing priorities. Implementing as many and as completely as possible will improve the effectiveness of communication.

3.6.2.1. Contact lists

Establish and frequently update a contact list (primary phone numbers and alternates, cell phone numbers, 24-hour numbers, home numbers, pagers, e-mail, fax numbers, and addresses) of

- Core members of the outbreak control team;
- Other officials inside the agency, such as the chief of the epidemiology unit, director of the public health laboratory, and the agency director;
- Critical contacts in other government agencies;
- Important food industry contacts, including trade associations;
- Key health-care provider contacts; and
- Primary media contacts.

3.6. Communication

Ensure the contact list is updated at least twice yearly and, when feasible, made available to all stakeholders by electronic (e.g., e-mail updates, shared and secure website) and hard copy (e.g., laminated contact card) formats. This is usually much more difficult than expected and requires tenacity, but it is critical for mobilizing resources in emergencies.

3.6.2.2. Communication among the agencies and units of the outbreak control team (e.g., among epidemiology, environmental health, and laboratory)

- Ensure everyone who may be involved in outbreak response knows the other team members.
- Decide on the basis of roles who will be notified when an outbreak is suspected, including any changes in notification according to the nature of the outbreak (e.g., pathogen type, involvement of commercial product) and timing (weekends and holidays versus week days).
- Identify the persons who will be responsible for communication on behalf of their organizational unit (epidemiology, environmental health, laboratory) and for the outbreak control team.
- Determine how confidential information will be stored and whether and how it can be shared.
- Determine who will receive copies of written reports.
- Establish routine communication among the outbreak control team members before an outbreak.
- Define a formal communication process for agencies of the outbreak control team for use during outbreaks. Options include daily phone calls and routine e-mail alerts. Developing a consistent approach to internal communications during an outbreak helps everyone on the team know what to expect.

3.6.2.3. Communication with other local, state, and federal authorities

- Distribute a list of your agency's contacts to other agencies, and obtain their contacts.
- Develop standardized templates and processes (including notification triggers and timelines) for sharing information with other agencies, including who will be responsible for notifying the next level of public health agency.
- Foster working relationships with other agencies, holding joint meetings and planning sessions before any outbreaks.
- Establish processes for participating in multiagency, multijurisdiction conference calls, and train staff in appropriate conference call etiquette.
- Determine how confidential information will be stored and whether and how it can be shared.

3.6.2.4. Communication with local organizations, food industry, and other professional groups (including health-care providers)

- Create templates for communications with each group (e.g., press releases, fact sheets), focusing on the most common foodborne diseases and customizing by group (e.g., health-care providers, school officials, restaurant managers). Sample materials are available at the CIFOR Clearinghouse.
- Create and test tools for rapid communication with each group (e.g., blast e-mails, blast faxes, Web-based survey instruments).
- Establish routine communications with each group (e.g., newsletters, e-mails), ensuring they will know with whom to communicate, triggers for reporting, and source of information during a foodborne disease outbreak. Be aware that recipients may ignore such communications, so try to make the communications interesting, relevant, succinct, and infrequent.

3.6. Communication

- Determine who will communicate with which groups during an outbreak.

3.6.2.5. Communication with the public

- Create templates for communications with the public (e.g., press releases, fact sheets), focusing on the most common foodborne diseases. Sample materials are available at the CIFOR Clearinghouse.
- Create and test Web-based tools for communication with the public (e.g., blast e-mails, survey instruments).
- Establish relationships with consumer groups that may be helpful in disseminating information about foodborne disease outbreaks and disease prevention messages.
- Periodically issue foodborne disease prevention messages or press releases to the public to reduce illness and ensure the public knows with whom to communicate (often their primary-care provider) and from where information will come during a foodborne disease outbreak.
- Establish standard channels of communication (e.g., website, telephone number), and use those same channels each time a public health issue arises about which the public may seek information. Make sure the public knows the source, or publish it where the public is likely to access it.
- Guide staff on how to respond to and communicate with angry food-service workers, managers, or members of the public.

3.6.2.6. Communication with cases and family members

- Identify individuals with clinical training, such as public health nurses or medical epidemiologists, to communicate with cases about the outbreak and actions they should take to protect their health and their family's health. Provide these individuals with training in communication for high stress/high outrage situations. Establish policies for communication with cases and family members, to ensure they get consistent and appropriate messages.

3.6.2.7. Communication with the media

- Identify an agency lead on media interactions, ideally someone trained as a public information officer. Establish procedures for coordinating communication with the media.
- Obtain media training for primary agency spokespersons.
- Identify contact persons from major local media outlets.
- Periodically hold a media education event to teach new media professionals in the community's media market about public health and response to foodborne disease outbreaks.
- Identify routine deadlines and time frames for reporting news through major local media outlets (e.g., the deadline for having news from a press release appear in the evening newspaper).
- Establish standard channels of communication (e.g., website, telephone number), and use those same channels each time a public health issue arises about which the public might seek information.

3.7. Planning for Recovery and Follow-Up

3.7.1. Overview

Part of preparing for outbreak response is planning for the recovery and follow-up stages. Make sure your agency's protocols include standardized processes for recovery and follow-up; these will help guarantee the appropriate actions are taken after each outbreak and investigation difficulties are identified and rectified before the next outbreak.

3.7. Planning for Recovery and Follow-Up

3.7.2. Recommended Preparations for Recovery and Follow-Up

- Establish standard protocols for actions that must be taken or results that must be achieved before an implicated facility or food source can resume normal operations.
- Establish standard protocols for monitoring an implicated facility or food source if monitoring postoutbreak should be deemed necessary.
- Establish a process for creating after-action reports following investigations, with lessons learned and action items for follow-up and quality improvement.

Detailed information about model practices for recovery and follow-up is included in Chapter 6.

3.8. Legal Preparedness

Ensuring that a given state or local public health agency has developed full legal preparedness for outbreak response provides a foundation for effective response efforts. In this context, a legally prepared health department has (a) the laws and legal authorities needed to support all relevant surveillance, detection, investigation, and control activities; (b) professional staff who understand and are competent in using their legal authorities; (c) memoranda of agreement and other legal agreements in place for coordinated implementation of laws across jurisdictions and sectors; and (d) information about best practices in using law for outbreak response. See Chapter 9 for details about legal preparedness and ways an agency can develop a legal framework to support its foodborne disease control activities.

3.9. Escalation

3.9.1. Overview

Even though a single agency is likely to be able to independently manage most outbreaks, in other instances the agency will need to—and should—ask for help. In addition, many outbreaks will become part of a multijurisdictional investigation.

A cardinal rule for all foodborne disease response programs: Ask for help earlier rather than later. Don't let the trail grow cold before getting help on the scene. Affected persons recover and forget details, labs destroy specimens, and food establishments throw out product. As noted at the beginning of this chapter, the primary goal of investigations of foodborne disease outbreaks is implementation of control measures as quickly as possible to prevent further illness. To fulfill this goal, an investigation may need to be escalated and to involve multiple agencies. Members of the outbreak control team should frequently ask themselves whether escalation is advisable and be ready to bring in outside help quickly.

Even an apparently local outbreak may herald part of a much bigger problem. This is especially true of an outbreak that appears to be associated with a facility that is part of a regional or national chain or when the suspected food is in general commercial distribution. Other indications of multijurisdictional outbreaks are listed in Chapter 8.

3.9. Escalation

3.9.2. When to Ask for Help

- Scale or complexity of outbreak seems likely to overwhelm agency resources.
- Outbreak is known or suspected to affect multiple counties, states, or countries.
- Investigation points to a commercially distributed product.
- Nature of outbreak (e.g., likely causative agent, affected population, scale) or response is beyond the experience of agency staff.
- Specific technical support is needed that requires expertise not available in the agency.

3.9.3. How to Obtain Help

- Steps in asking for help vary by agency seeking help and for what purpose.
- At the local level, call the State Epidemiologist or his/her surrogate. Most state epidemiology offices have a 24-hour number and someone on 24/7 call.
- At the state level, call the most appropriate office at CDC or the CDC emergency response number, which is staffed 24/7. Emergency response staff will contact the appropriate office at CDC.
- If the suspected product falls under the jurisdiction of one of the food-regulatory agencies, call that agency using its 24-hour contact number.
- Be prepared to share as much information about the outbreak as possible including setting of the outbreak, population at risk, suspected etiologic agent, suspected source and agencies involved.

3.10. Incident Command System

3.10.1. Overview

Increasingly, agencies responding to a public health emergency, occasionally including foodborne disease outbreaks, consider using an Incident Command System (ICS) to help coordinate response.[1] ICS are structures that provide for internal communications within a government system between primary event responders, public information officers, and security and safety officers and for external liaison with various organizations. In concept, the ICS structures provide for communication and coordination among agencies involved with responding to a multijurisdictional outbreak of foodborne disease.

The role of an ICS response in outbreak investigations varies and is not without controversy. Even within a single investigation, some agencies may use an ICS structure while others do not. In some states and local jurisdictions ICS are formal structures controlled by public safety officials with no other jurisdiction for food safety or outbreak control, which can distract from the conduct of a public health investigation. However, some public health and food-safety agencies are starting to embrace ICS and adapting the ICS structure to meet their needs.

3.10.2. Definition and History of ICS

The ICS originally was developed in the 1970s to coordinate activities to control wildfires in California. The system has been expanded and integrated into the Federal Emergency Management Agency's National Incident Management System (NIMS) to aid intra-agency and interagency coordination, especially during large-scale emergencies that involve multiple jurisdictions. The ICS features a clearly defined chain of command with common nomenclature for key management positions; defined management sections; and a modular organizational structure; and uses specifically defined emergency response function roles.

3.10. Incident Command System

ICS, as an integral part of NIMS, is a widely applicable management system designed to enable effective, efficient incident management by integrating a combination of facilities, equipment, personnel, procedures, and communications operating within a common organizational structure. ICS is a fundamental form of management established in a standardized format, with the purpose of enabling incident managers to identify the key concerns associated with the incident—often under urgent conditions—without sacrificing attention to any component of the command system.

The ICS organizational structure develops in a modular fashion according to the size and complexity of the incident, as well as the specifics of the hazard environment created by the incident. Responsibility for the establishment and expansion of the ICS modular organization ultimately rests with the Incident Commander, who bases the ICS organization on the requirements of the situation. As incident complexity increases, the organization expands from the top down as functional responsibilities are delegated.

3.10.3. Context for Use

Agencies involved in foodborne disease outbreak investigation and response should decide in advance whether and how to apply an ICS, and, if applicable, incorporate the ICS structure into their response planning. Such planning should be coordinated with all other agencies that may be drawn into the investigation and response over time. Most foodborne disease outbreak investigations do not require formal activation of ICS, but may benefit from application of ICS principles and methods.

If someone who claims to have tampered with food contacts an agency, or in any outbreak in which intentional contamination is suspected, notification of law enforcement officials and assessment of the credibility of the threat are essential. If the threat is credible, the outbreak would move into a law enforcement realm with activation of the ICS.

Early inclusion of ICS principles and methods can prevent problems over the long term. Trying to pick up and implement ICS after an incident has expanded creates many organizational issues for all responders involved. In recent years, federal departments and agencies have begun moving toward making adoption of NIMS by state, tribal, and local organizations a condition for federal preparedness assistance, including grants and contracts.

3.10.4. Training

If an agency elects to apply the ICS structure to its foodborne disease outbreak response, then ICS training should be provided to the outbreak response team before any outbreaks. Ideally that ICS training would use foodborne disease outbreak examples so all team members clearly understand how to use the ICS structure in an outbreak situation.

3.11. Reference

Qureshi K, Gebbie KM, Gebbie EN. - Implementing ICS within public health agencies. Albany, NY: State University of New York, Albany; 2005. Available at http://www.ualbanycphp.org/pinata/phics/guide/default.cfm.