CHAPTER

6

Control Measures

The purpose of outbreak investigations is to stop the current outbreak, determine how the contamination occurred, and implement prevention-based approaches to minimize the risk for future outbreaks. Whereas the investigation is critical for understanding the cause, effective control measures are critical for actually stopping the outbreak and preventing reoccurrence at this and other locations.

Specifically, the objectives of control measures are to

- Prevent additional exposures; and
- If appropriate, alert the public, and tell people how to protect themselves.

In addition, investigation into the circumstances likely to have contaminated the food will lead to long-term prevention efforts. The objectives of this phase of the investigation are to:

- Prevent future outbreaks from the same source or practices; and
- Identify changes in policy or practice that will prevent future outbreaks from similar causes.

6.0. Introduction

Rapid response is key, it is important for investigators to quickly assess available information to identify suspected food or facilities, and send environmental investigators into the field as soon as possible. Contaminated food might be served at the next meal, or an ill employee might repeatedly contaminate food products. Practices or environmental conditions that led to the outbreak are likely to continue unless an intervention stops them. The source of the outbreak could be a nationally distributed food product, and a recall might be necessary to prevent additional illnesses across the country. Any time an outbreak is identified and possibly linked to a site, immediate response is critical.

The two major types of foodborne disease outbreaks—those originating from retail food establishments (which sell to the consumer) or from home preparation of food and those originating from commercial processors/producers—require two different types of control measures. Outbreaks originating from local retail food establishments, local problems at chain retail food establishments, or homes can be controlled through local food-regulatory authority actions. However, outbreaks originating from commercial processors/producers/distributors or multiple sites at chain retail food establishments typically require state and federal agency intervention.

Communication is critical in determining what control measures to implement and when to change an intervention's focus. To be effective, control measures must correlate with the likely causes of the outbreak, which are usually identified in the early phases of the epidemiologic investigation. Thus, early sharing of information from epidemiologists to environmental investigators is highly valuable. Likewise, frequent communication from environmental investigators that are implementing control measures with epidemiologists and laboratorians is critical because, as the epidemiologic investigation proceeds, different possible causes for the outbreak might be identified. Information gathered in the environmental investigation also can lead epidemiologists to identify contributing factors and environmental antecedents.

6.1. Information-Based Decision-Making

6.1.1. Concurrent Interventions and Investigations

Control measures should be implemented concurrently with investigations. Waiting for laboratory results, confirmed medical diagnosis, or results of all investigations is not necessary before initial control measures are implemented. Sometimes nonspecific control measures can be implemented immediately to prevent further transmission of disease, regardless of the type of disease or source (see section 6.2.1 below).

Sending at least two investigators to a food establishment implicated in an outbreak is best. One investigator can make certain that food about to be served is safe (e.g., no implicated leftovers are served, foods are at proper temperature, food was prepared without contact by bare hands, no ill food workers are preparing food). The second investigator conducts the investigation (e.g., obtains the menu to review everything served to cases, identifies persons who prepared suspected items, determines how the foods were prepared, determines what other groups were served the same foods). (See Chapter 5 for additional information about investigation steps.)

6.1.2. Considerations When Implementing Control Measures

Such interventions as recalling food or closing food premises can have major legal

6.1. Information-Based Decision-Making

or economic consequences, just as inaction or delayed actions can have important public health consequences. The outbreak investigation and control team must balance possible legal or economic consequences against the likelihood that any actions taken will prevent further disease. Issues to be considered when deciding whether and how quickly to implement an intervention include:

- The quality of information.
  Does evidence implicating a particular source derive from a credible analysis of available data and current knowledge? Such analyses might include a controlled study (e.g., case–control study or cohort study) or results of a dynamic cluster investigation. Controlled studies need to be well-designed and executed and of sufficient size to detect differences, with consideration given to information or selection bias and possible confounding factors. Regardless of the types of studies or methods used to implicate a source, the outbreak investigation and control team needs to consider whether the findings of different studies are consistent (e.g., several case–control studies undertaken at different sites or among epidemiologic, environmental, and microbiological studies); whether the methods for collecting data and the quality of the data collected truly support action; and whether the implicated source is biologically plausible, especially if the implicated source is new or novel.
- The outcome of the environmental health assessment.
  Do the findings from the environmental assessment support the conclusions drawn by the epidemiology or laboratory team members? Does the environmental assessment establish a picture of events that could logically support the overall epidemiologic picture of the outbreak?
- The balance between consequences of taking and not taking action.
  Is immediate intervention necessary because the outbreak is caused by a highly pathogenic microbe, easily spread and likely to be a source of secondary infections in the community, or known to cause death or serious complications? What impact will action have on the business or industry? Does taking action present a minor inconvenience or will it have resounding and lasting effects on the business or industry? Is a narrower, focused action possible—such as recalling a specific group of products or notifying only the persons most likely to have been exposed—rather than a more general recommendation to avoid consuming a general category of food or notifying the public? Will the actions affect only one business or an entire industry? How much economic or operational burden will be placed on members of the public who will need to respond on the basis of the proposed action?
- The potential for intentional contamination.
  If any possibility exists that an outbreak might be due to intentional contamination, then law enforcement agencies will need to be notified immediately. The procedures for controlling the outbreak will change significantly (see section 6.3).

These considerations can add confidence to decision-making. Precautionary control measures that have high potential for public health benefit and low impact on business operations, such as holding a specific nonperishable food from sale or excluding an ill employee, are usually not controversial and easily can be implemented in the field by the regulatory authority. However, many decisions about implementing, or waiting to implement more rigorous interventions require input from the entire investigation and control team, including epidemiology, laboratory, and environmental health specialists and legal advisors, and might need input from companies, trade associations, or other industry and academic experts.

6.2. Control of Source

6.2.1. Nonspecific Control Measures

6.2.1.1. Neither food nor facility have been implicated

If the pathogen causing an outbreak is known, limited control measures might be possible even before the mode of transmission is clear or a food or facility have been implicated. Control measures, at this point, will be nonspecific (i.e., not aimed at the definitive source of the outbreak) and will focus on preventing secondary spread by known cases and on communicating with health-care providers and the public (see information about public communication, section 6.5.3).

Communications with health-care providers might include advice about specific laboratory tests, treatment and follow-up of cases, instructions to cases about personal hygiene and ways to avoid spreading the infection, and infection control precautions for hospitalized and institutionalized patients. If communication with the public is determined to be necessary, it should include practical measures to decrease risk for illness (e.g., avoidance of known high-risk foods or special instructions for their preparation), as well as basic food-safety messages and information about how to contact public health authorities to report suspected related illnesses.

Alerting the public about an outbreak early in an investigation, when little is known or can be done about it, is not without controversy. Announcements about an outbreak (and even implication of a type of food without information about its origin) can alarm (and even panic) consumers who can do little to protect themselves and cause them to undertake unnecessary or irrational actions. Such announcements also can negatively affect industry as the public strives to avoid foods (or other products) possibly related to the outbreak.

The balance between possible harm to consumers and industry and likely benefit of such announcements must be carefully weighed. However, if such communications could prevent additional cases of the disease, they should be considered when the disease is serious, life-threatening, or widespread and/or might particularly affect persons at high risk for poor health outcomes from the disease.

Communication with other agencies (i.e., local, state, and federal) involved in the investigation also is critical at this stage. Coordinating a single public information message can help alleviate confusion among consumers and businesses. Two agencies sharing different messages on the same outbreak leads to frustration and doubt about the decisions being made.

In addition, communication with the food industry during the early stages of the investigation is important. Industry information about suppliers, storage, and handling of the food products possibly involved in an outbreak can help to identify the products on which the investigation should focus (see section 6.5).

6.2.1.2. Facility has been implicated

Nonspecific control measures can be implemented when a facility has been implicated, even though a specific food has not yet been identified. These steps are good public health practice and generally are effective, regardless of disease. These critical first actions include:

- Properly holding the leftovers and suspected ingredients for further laboratory analysis, if warranted;
- Stopping bare-hand contact with food;
- Emphasizing hand washing;
- Monitoring and recording time and temperature control of food;
- Excluding employees ill with gastrointestinal symptoms (e.g., nausea, vomiting, diarrhea, stomach cramps) and daily monitoring of employee health to ensure that employees

6.2. Control of Source

possibly incubating the illness do not cause additional illness;

- Thorough cleaning and sanitization of the environment to eliminate possible sources of contamination; and
- If norovirus is strongly suspected, prohibiting the serving of uncooked foods until the causal pathway has been identified and remediated.

In deciding what control measures to implement, check with epidemiologists and laboratory team members to determine the type of pathogen thought to cause the outbreak, even if the specific causative agent is not yet known. For example, on the basis of symptoms, these team members often can characterize the type of agent involved, e.g., viral, bacterial, chemical. This information can help identify and prioritize control measures.

Control measures should be adjusted on the basis of knowledge of the agent, and whether a food item has been implicated. An outbreak caused by *Clostridium perfringens* has very different contributing factors and control measures than an outbreak caused by norovirus. Whereas controls for a *C. perfringens* outbreak would focus on rapid cooling, proper hot holding, and reheating, controls for norovirus would focus on exclusion of ill employees, proper hand-washing, no bare-hand contact of ready-to-eat foods, and (possibly) changes in the source of any shellfish used in the facility. Focusing on pathways commonly linked to the agent will more likely address the underlying causes of the outbreak.

Check the history of the establishment for previous outbreaks, illness complaints, or food safety problems. What is the establishment's history of correcting violations? A history of serious hazards or of not correcting violations might warrant closure.

While taking these first actions, be sure to collect appropriate samples for laboratory analyses, and document and maintain chain-of-custody practices. Discarding suspected food can help stop the outbreak, but isolating the etiologic agent from the food provides additional evidence of a particular food as the outbreak's source. Food samples need to be collected as early in the outbreak investigation as possible. Whether to analyze these samples can be decided later when more information is available. Storage capacity for samples collected for later analysis should be considered before an outbreak. Ideally, written policy guidance developed in collaboration with the public health or regulatory laboratorians on sample collection and management is already in place. If not, contact your public health or regulatory laboratory to find out how much food to collect, how to collect it, and how to store it. The guidance should cover samples that have been collected from food prepared for consumption or food that has been partially consumed, as well as samples from food for which regulatory action could readily be taken, such as unopened boxes of suspected food.

The facility from which the samples are collected should be notified and afforded the opportunity to collect companion samples.

6.2.2. Specific Control Measures

When a specific food(s) has been implicated, specific control measures can be implemented. Although all of the following control measures are recommended, full implementation of all these practices might not be possible in some jurisdictions. Implementing as many as possible and as completely as possible will improve the effectiveness of the control measures.

Control measures vary depending on whether the implicated food is associated with food-service establishments (whether single or multiple facilities) or home preparation or is processor/producer-based. The outbreak response team must determine as soon as possible whether one facility or multiple facilities are involved.

6.2. Control of Source

6.2.2.1. Foods associated with food-service establishments or home preparation

6.2.2.1.1. Removing food from sale or preventing consumption

- Collect samples of any foods discarded by the establishment or foods embargoed or placed on hold by regulatory officials.
- Most regulatory agencies have the authority to embargo, hold, or stop the sale of food suspected to be a source of an outbreak. Such action should be taken when the epidemiologic or environmental investigation supports the biological or environmental plausibility that certain foods are the outbreak's source. Contact the applicable regulatory agency as soon as it appears possible that the outbreak involves product that might have been contaminated during production.
- In investigation and enforcement matters, issuing a written hold or embargo order establishes a clear expectation and regulatory requirement for holding the food. This action will prevent the owner from serving or destroying the food before the investigation is complete.
- Fully document the information that led to the decision (whether to remove or not remove food) and the process used to make the decision.

6.2.2.1.2. Cleaning and sanitizing

- Ensure the facility is thoroughly cleaned and sanitized, followed by microbial verification of the effectiveness of the cleaning and sanitizing processes. This process includes disassembling all equipment and retraining staff on proper cleaning and maintenance procedures for the equipment. The cleaning and sanitizing process is particularly important if *Salmonella*, *Listeria monocytogenes*, or norovirus is suspected. Guidance documents targeted at industry include:
  - Guidance for the Control of *Listeria monocytogenes* Risks in Retail Food Stores, www.fmi.org/docs/food-safety/listeria-guidance.pdf?sfvrsn=4
  - FMI Listeria Action Plan for Retail Delis, www.fmi.org/docs/food-safety-best-practice-guides/listeria-action-plan-for-retail-delis.pdf?sfvrsn=9
  - Norovirus Information Guide, http://fmi.org/docs/food-safety-best-practice-guides/norovirus_info_guide-1-.pdf?sfvrsn=2

Examples of cleaning, sanitizing, and microbial verification protocols can be found in the Food and Drug Administration's (FDA's) Food Code in Annex 4 (www.fda.gov/food/guidanceregulation/retailfoodprotection/foodcode/ucm188363.htm).

6.2.2.1.3. Training

- Require training of managers, supervisors, and staff on general practices of safe food preparation, and if the specific pathogen is known, implement practices specific to control of that pathogen. Ensure that employees newly transferred to or from the involved food establishment are included in the training.
- Require the facility manager to document training of both current and newly hired staff.

6.2.2.1.4. Modifying a food-production or food-preparation process

- Ensure that food-production or food-preparation processes are appropriate and adequate to prevent further contamination of food or survival and growth of microbes already present in food.
- Modify processes if needed to reduce risk, such as changing a recipe, changing a process, reorganizing preparation processes, changing storage temperatures, or modifying instructions to consumers. Evaluate the

6.2. Control of Source

proposed times, temperatures, pH, and water activity level for controlling the pathogen of interest on the basis of sufficient scientific evidence.

- Eliminate any bare-hand contact with ready-to-eat food, and ensure that all employees are following appropriate hand-washing and food-handling practices.
- Conduct follow-up monitoring to ensure that modified processes have been implemented and are effective in addressing the food safety problem.
- Require that Active Managerial Controls, such as a Hazard Analysis and Critical Control Point (HACCP) system, be implemented, if not already in place. Such controls should be in the form of a written plan, and all staff should be trained on the plan.

6.2.2.1.5. Modifying the menu

Eliminate implicated foods from the menu until control measures are in place. For example, if shell eggs are implicated, remove all foods that contain shell eggs, and substitute pasteurized egg product until the investigation is complete and proper controls are in place.

6.2.2.1.6. Removing infected food workers

Ensure that infected food workers are excluded from the workplace or restricted in accordance with the Food Code or other regulatory requirements

6.2.2.1.7. Closing food premises

- If the owner is unable or unwilling to take immediate corrective action to eliminate food-safety hazards, closing the premises might be necessary. The facility must meet closure requirements as defined in local regulations, typically defined as presenting an imminent or substantial health hazard. This conclusion can be determined from observation or evidence that disease could be spread because of increased risk factors.
- If the food premises are in an institution in which residents have no alternatives, work with institution staff either to identify options for bringing in food or to leave food premises open but eliminate high-risk items from the menu.
- If the facility owner will not act voluntarily, employ other control measures, such as cease-and-desist orders, permit action, or a legal hearing.
- Follow local regulations when requiring closure of food premises. Establish a clear plan with criteria that need to be met, including appropriate environmental testing if available, for the facility to reopen. Reopen only when the criteria have been met. Provide the facility with a timely re-inspection that would qualify it for reopening.

6.2.2.1.8. Communicating with the public

- If the outbreak involves only one facility, determine whether public notification is necessary. All members of the outbreak investigation and control team (epidemiology, environmental health, and laboratory) and health department leadership should be involved in making this decision. Ask the following questions:
  - Is medical treatment necessary for persons who might have been exposed to the etiologic agent? If so, public notification is critical.
  - Is public reporting of suspected illness necessary to determine the scope of the outbreak? If so, public notification might be appropriate.
  - Is the source of the outbreak short term so no further risk exists to the public? If so, public notification generally is not necessary.
  - Does risk for exposure still exist? People take food home from restaurants, so public notification still might be appropriate.

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- Prepare communication following the agency's risk communication protocols. Seek assistance from the agency public information officer or the public information officer at another agency if the agency with jurisdictional responsibility does not have this resource.

CIFOR Keys to Success: Focus Area 10—Control of source at implicated facility

Control measures

- Agency/jurisdiction works with the facility or production site, appropriate regulatory agency, and industry representatives to determine the desired control measures.
- Agency/jurisdiction has legal authority to require the desired control measures.
- Agency/jurisdiction and food-establishment management team consider a variety of control measures to address the food-safety problem (e.g., removing the vehicle from consumption, cleaning and sanitizing the environment, educating food workers, modifying food preparation, excluding ill staff, requiring no bare-hand contact of ready-to-eat foods, requiring monitoring and recording of food temperatures).
- Agency/jurisdiction implements control measures as soon as sufficient information is available to do so.

Communication

- Outbreak investigation and control team members share information from the outbreak with each other and with other appropriate health and regulatory agencies in a timely fashion. If multiple facilities across jurisdictions are implicated, response team members also communicate with officials in other jurisdictions involved in the outbreak (see Chapter 7 for Multijurisdictional Investigation Guidelines.)
- Staff effectively communicate control measures to facility manager, facility workers, and others involved in implementing control measures and provide education, as needed.
- Agency/jurisdiction engages with industry to share the significance of the findings and provide the firm with the basis for a pending recall action and/or the opportunity to present different conclusions about the source of the outbreak. This exchange enables both parties to exchange all relevant information about production practices, distribution patterns, consumer complaints, and pending information.

Monitoring

- Agency/jurisdiction monitors the implementation of control measures at the implicated facility and the effectiveness of those control measures. The inspection frequency is increased for the implicated facility to ensure that hazards do not reoccur.
- Agency/jurisdiction monitors the population at risk to ensure the outbreak has ended and the source has been eliminated.

Making changes

- Agency/jurisdiction debriefs investigators after each outbreak response and refines outbreak response protocols on the basis of lessons learned.
- Agency/jurisdiction has performance indicators related to control of the source at the implicated facility and routinely evaluates its performance in this Focus Area.

6.2. Control of Source

6.2.2.2. Foods associated with a processor/producer

Implication of multiple food-service establishments in an outbreak or receipt of multiple, seemingly unrelated reports of illness from consumers eating the same type of food suggest an outbreak caused by food contaminated at the processor/producer-level. Trace-back investigations can help identify the point in the production and distribution process at which the implicated food most likely became contaminated and enable targeted environmental assessments to determine how the food became contaminated and to recommend specific interventions. Early engagement with the food processor/producer and the appropriate food-regulatory agency can help identify specific products that might be associated with the outbreak.

Depending on the scope of the outbreak and probable point of contamination, most of the specific control measures listed above (section 6.2.2.1) also will be appropriate once the point of contamination is identified. However, food implicated in these outbreaks might be more likely to be in distribution, at retail establishments, or in the homes of consumers. Therefore, public health and food-regulatory agencies also will need to decide whether to remove the suspected food from the market by using the procedures defined in section 6.2.2.2.1 below. If the food-regulatory agency has adequate information to implicate and accurately identify a contaminated food item, it will take the lead on recall activities.

Contact the federal or state regulatory agency that has jurisdiction over the product. FDA regulates the safety of most foods, except meat, poultry, and most out-of-shell egg products (which are regulated by the U.S. Department of Agriculture [USDA]). FDA or USDA will contact the manufacturer about the decision to remove the product from the market and will obtain the manufacturer's cooperation. The regulatory authority might recommend that the manufacturer issue a food recall. In addition, the regulatory authority and/or the manufacturer might ask retailers to remove the product from their shelves and ask distributors to withhold the product from distribution.

Recall of food at the processor level generally requires federal and/or state action. In some jurisdictions, the local health jurisdiction will embargo (impound) the food (tagging the food to make sure it is not moved or sold or ordering it destroyed). Under the Food Safety Modernization Act, FDA can order the embargo of food for up to 30 days without a court order.

Questions to ask in considering whether to remove food from the market:

- Is risk to consumers ongoing?
- Is the product still on the market or in the distribution system?
- Is the product likely to be in the homes of consumers?
- Does the information justify removing food from the market? Remove the food if:
  - The illness and consumption of that food show a strong epidemiologic association (e.g., through a case–control or cohort study or other rigorous epidemiologic method), even if the pathogen has not been isolated from the food. Strong epidemiologic association requires a good quality analytic study that links the implicated food to the cases.

  OR

  - Definitive lab results show the outbreak pathogen is present in the product. The results must be based on a food sample that is representative of the food eaten by the cases and has been handled properly to avoid cross-contamination.

  OR

  - Epidemiologic association is not strong, but the pathogen is so hazardous that the

6.2. Control of Source

risk to the public is very high. Under these circumstances, there may be no analytic controlled studies, but if the descriptive epidemiology (e.g., demographic characteristics of cases, geographic distribution, or onset of illness) suggests an association between the disease and the suspected food, then removing food from the market might be warranted, even in the absence of confirmed laboratory findings.

Fully document the information that led to the decision (whether to remove or not remove food) and the process used to make the decision.

6.2.2.2.1. Procedures for removing food from the market

Once a decision is made to remove food from the market, the goal is to remove it as quickly and efficiently as possible (Box 6.1). Foods with short shelf lives (e.g., fresh produce, meat, dairy products) generally are consumed or discarded within 5–10 days, depending on product, and already might have been discarded. Foods with longer shelf lives most likely will still be around. Try to prevent additional exposure by ensuring suspected food is not eaten.

To improve the effectiveness of recall measures and industry response, health and food-regulatory agencies can

- Develop a list of control measures to implement immediately when an outbreak-related or illness-related recall has been identified.
- Identify industry needs, and develop guidance for interacting with public health or agriculture officials investigating an outbreak. Provide retailers and manufacturers with 24/7 contact numbers and e-mails for regulators at the local, state, and federal levels, including FDA and USDA's Food Safety and Inspection Service.
- Develop guidance for communicating with the news media.
- Develop guidelines for mitigating impact of the recall, such as providing refunds for returned product.
- Develop templates, message maps, or community information sheets for common foodborne agents for use during an outbreak.

Detailed information and sample forms for use by food establishments are included in the "CIFOR Foodborne Illness Response Guidelines for Owners, Operators and Managers of Food Establishments," which is available from the National Association of County and City Health Officials.

Regulators responsible for retail food facilities need a means to immediately notify all food facilities in their jurisdiction through e-mail, blast fax, or phone calls of a recall. Identifying subcategories of facilities is highly recommended so notices can be targeted to specific facilities (e.g., notices of a seafood recall sent specifically to seafood retail establishments). This process should include food-bank donation centers and other sites that might have received food donations.

If any distributors or retailers refuse to remove the food, issuance of a public health warning and order to require action might be necessary. The appropriate agency for this action depends on the type of food and etiologic agent.

The agency/jurisdiction should monitor to ensure the recall is effective in stopping illnesses and food is completely removed. Are illnesses continuing after the recall? If so, why? Is there another contaminated product or lot number that has not been recalled? Was the product purchased after the recall? If so, from where? Was the consumer aware of the recall notice?

Ensuring the effectiveness of recalls often requires close cooperation among local,

6.2. Control of Source

Box 6.1. Recommendations for manufacturers and retail establishments to help ensure an effective food recall

Manufacturers

Recall preparedness (before an outbreak occurs):*increases with the size of the odds ratio or relative risk:*

- Maintain product source and shipping information for quick access in conducting tracebacks and traceforwards during an investigation and/or recall.
- Develop the ability to rapidly notify all customers of a recall through blast e-mail and fax, calls, text messaging, and mail to retail establishments who purchased recalled foods.
- Identify and develop procedures to prevent common errors that result in recalled food being returned to commerce (e.g., recalled food is returned and accidentally put back into distribution by workers).

After a recall is announced:

- Quickly remove recalled contaminated product from the distribution system.
- Notify customers through the regulatory agencies and news media, as needed.
- Ensure retail customers have clearly defined storage areas and handling processes for recalled products, including denaturing or other process to ensure foods are not resold.
- Put in place systems for safe handling or disposal of recalled products to avoid cross-contamination to other products, accidental redistribution, diversion, and creation of other hazards.

Retail Food Establishments

Recall preparedness (before an outbreak occurs):

- Maintain product source and shipping information for quick access in conducting tracebacks and traceforwards during an investigation and/or recall.
- When store cards are issued, obtain customers' e-mail addresses and phone numbers, and inform them they will receive notifications of any recalls of items they purchase. Inform consumers their store card information might be provided to outbreak investigators if allowed by state law.
- Develop the ability to rapidly notify all customers of a recall through blast e-mail and fax, text messaging, social media, calls, and mail to people who purchased recalled foods.
- Identify and develop procedures to prevent common errors that result in return of recalled food to commerce (e.g., recalled food is returned and accidentally put back onto shelves or into distribution by workers; product is pulled from sale from one location and not throughout the store; expanded recalls are ignored; another shipment arrives and is put onto the shelves or into distribution).

After a recall is announced:

- Quickly remove recalled product from commerce at the food facility.
- Notify customers through the regulatory agencies and news media, as needed.
- Post signs at the point of sale to advise consumers about the recall.
- Put in place fail-safe systems that do not allow sale of recalled products (e.g., cash registers that flag recalled products or that prohibit the sale of recalled products). Ensure stores have clearly defined storage areas and handling processes for recalled products, including denaturing or other process to ensure foods are not resold.
- Put in place systems for safe handling or disposal of recalled products to avoid cross-contamination to other products, accidental restocking, diversion to unsuspecting consumers, and creation of other hazards. Consider the possibility of homeless persons removing discarded product from the trash. Follow any guidance from the local health authority.
- For a highly dangerous condition, such as botulism, food seizure by the health department or regulating agency is appropriate to ensure immediate and complete removal of the suspected food from the market.

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state, and federal agencies on audits for recall effectiveness checks. If the product is not immediately removed, determine why.

- Did the manufacturer notify the distributor of the recall?
- Did the distributor notify retailers of the recall?
- Was the recall information clear and complete, including, for example, all lot numbers, use-by dates, bar codes?
- Did notifications occur but no action was taken?
- Was returned recalled product diverted and sold elsewhere?
- If the recall is not effective, notify appropriate state, federal, and neighboring health and food-regulatory agencies.
- Issue a public advisory if needed.

6.2.2.2.2. Communication with the public

Messages to the public about foodborne disease outbreaks should follow good risk communication practices. Ideally, templates for public messages should be prepared before the outbreak and used consistently (see section 6.5 below and the CIFOR Clearinghouse, www.cifor.us/clearinghouse/keywordsearch.cfm, for examples of communication templates).

Notify the public if the outbreak involves distributed product. Provide information about how to handle the suspected product (discard, special preparation instructions, or return to place of purchase). Provide information about the disease, including symptoms, mode of transmission, prevention, and actions to take if illness occurs.

If the manufacturer refuses to recall the food, it should be advised promptly that public health agencies or regulators might issue their own notice to the public, and the notice could include the message that the firm declined to voluntarily recall the product. The message to the public should describe the situation and provide clear actions.

Means of notification depend on the public health risk and the target population and might include press releases, radio, television, fax, telephone, e-mail, Web posting, social media, or letters. The manufacturer, public health agencies, regulatory agencies, retail food establishment, or all four can initiate notification. These releases should be coordinated and include consistent messages to avoid confusing the public.

Attempt to reach all members of the population at risk, including non–English-speaking and low-literacy populations. Provide only objective, fact-based information about the outbreak. Do not give out preliminary, unconfirmed information. If a specific food—such as a particular brand of bagged produce—is implicated, the press releases need to inform consumers whether the local jurisdiction is interested in obtaining the product from households that still have it and, if not, the proper method of disposal.

If the outbreak is large or the etiologic agent is highly virulent, consider setting up an emergency hotline so the public can call with questions. Persons answering the phones should be trained to give consistent responses. The hotline might require having staff work after hours to answer phones after the early evening news or to respond to questions posed on social media.

If press releases are to be issued by retailers or manufacturers, relevant local, state, or federal officials should review and approve them before release. Food establishments and producers often seek guidance on the contents of their press releases, and public health and food-regulatory agencies can provide needed information and help to ensure consistent communication.

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The state or local agencies responsible for the investigation should issue their own press releases, even if the affected industry or business also is issuing a release. Local press releases often result in better coverage from the local media. If more than one agency is involved, coordination of press releases is important for alignment of messaging. If time allows, give affected industry members or businesses an opportunity to comment on your releases so that they can verify specific information, such as use-by dates; when possible, include a picture of the product label. However, avoid prolonged negotiations about wording.

6.2.2.2.3. Post-recall reporting by the food business or manufacturer

If a food business or manufacturer recalls a product, it should prepare interim and final reports about the recall. The contents of these reports are used to determine the need for further recall actions.

The reports should include copies of all notices distributed to the public and through the distribution chain, as well as the following information:

- Circumstances leading to the recall and actions taken;
- Extent of distribution of the suspected food;
- Result of recall (percentage of suspected food recovered);
- Method of disposal or reprocessing of suspected food;
- Difficulties experienced in recall, and
- Actions taken to prevent recurrence of food-safety problems and any recall difficulties.

CIFOR Keys to Success: Focus Area 11—Food Recall

Recall Processes

- Agency/jurisdiction collaborates with state and federal agencies, as well as with the facility or production site implicated in the recall.
- Agency/jurisdiction proactively embargoes or seizes the implicated food product while awaiting official recall.
- Agency/jurisdiction has means to quickly notify retail food establishments and other sites (e.g., food banks) under its jurisdiction about the recall.
- Agency/jurisdiction has means to quickly notify public about recall.
- Agency/jurisdiction investigates new illnesses and monitors the effectiveness of the recall at all appropriate food establishments.

Making changes

- Agency/jurisdiction debriefs investigators after each outbreak response and refines outbreak response protocols on the basis of lessons learned.
- Agency/jurisdiction has performance indicators related to food recall (including the number of illnesses from consuming the implicated product after the recall) and routinely evaluates performance in this Focus Area.

6.3. Intentional Contamination

6.3.1. Indicators of intentional contamination of food

Although intentional contamination of food is very rare, a number of such instances have been reported, and agencies responding to outbreaks should always keep in mind the possibility that an outbreak might be caused by a criminal act. Possible indicators of intentional contamination include:

- Unusual relationships between the individual, time, and location of the outbreak;
- The presence of unusual microorganisms in host foods;
- A shorter-than-usual incubation period that results from an unusually high inoculum or more effective exposure route;
- The presence of a large epidemic, with greater case loads than expected, especially in a discrete population;
- More severe disease than expected for a given pathogen, as well as unusual routes of exposure;
- A disease that is unusual for a given geographic area, is found outside the normal transmission season, or is impossible to transmit naturally in the absence of the normal vector for transmission;
- Multiple simultaneous epidemics of different diseases;
- Unusual strains or variants of organisms or antimicrobial resistance patterns disparate from those circulating locally;
- Claims by a perpetrator of intentional contamination;
- Knowledge that a perpetrator has access to a particular agent or agents; and/or
- Direct evidence of intentional contamination, with findings of equipment, supplies, or tampering.

Many of these indicators can be seen with naturally occurring outbreaks, so the presence of any one or even several of them should not lead to an immediate conclusion of intentional contamination. However, these indicators should cause heightened awareness, and the outbreak investigation and control team should consider the scenario of intentional contamination.

6.3.2. Actions to take when intentional contamination is suspected

Each agency should establish a process for actions to take if intentional contamination is suspected. This process might include an internal review of all evidence before notification of law enforcement agencies. Organizations responsible for outbreak investigations should determine in advance of any outbreak which law enforcement agencies will be notified in the event intentional contamination is suspected and how that notification will occur. The following state and federal organizations are likely to be involved in any investigation of intentional contamination:

- Federal Bureau of Investigation Field Offices, www.fbi.gov/contact-us/field
- FDA Office of Criminal Investigations, Field Offices, www.fda.gov/ICECI/CriminalInvestigations/ucm123034.htm
- USDA Food Safety and Inspection Service, Office of Program Evaluation, Enforcement and Review, Compliance and Investigations Division, www.fsis.usda.gov/wps/portal/informational/contactus/
- State and Local Fusion Centers, www.dhs.gov/state-and-major-urban-area-fusion-centers

Any criminal investigation will need to be coordinated with the foodborne outbreak investigation. The lead law enforcement agency should work with the outbreak investigation

6.3. Intentional Contamination

and control team to address issues such as crime scene management, documentation of chain-of-custody, and handling of procedures for environmental and human specimens, because these should be considered evidence to support a criminal investigation.

When a written or verbal threat regarding possible contaminated or tampered food is received (directly to the public health authority, through the media, or through the food industry), law enforcement authorities should be notified immediately. Such threats might be a hoax or the work of an extortionist, and release of premature information might lead to panic or play into the hands of the perpetrator.

6.4. Control of Secondary Spread

6.4.1. Information for Health-Care Providers

Communicate with health-care providers in the community to encourage them to report cases of the illness under investigation, collect appropriate specimens and conduct specific laboratory tests, and provide specific treatment and infection control guidance.

6.4.2. Information for the Public

Any outbreak is an opportunity—or "teachable moment"—to reinforce basic food safety messages to the public and to inform the public about how to contact appropriate authorities to report suspected foodborne illnesses. Educational materials on food safety targeted at the public are available from the Partnership for Food Safety Education at http://www.fightbac.org/. Following are specific food safety messages that are important to communicate to the public.

6.4.2.1. Personal protection from disease outbreak

- Thoroughly wash hands with soap and warm water after defecation and urination and before preparing or eating food. Also wash hands after changing diapers, assisting a child at the toilet, and handling animals or animal waste. Hand washing is the single most important measure to protect the health of one person or many.
- At home or at a social gathering (e.g., potluck dinner), avoid eating food that has not been handled properly (e.g., hot food that has not been kept hot, cold food that has not been kept cold).

6.4.2.2. Proper food preparation

- Use best practices when handling food at home (thoroughly cook food; keep hot food hot and cold food cold; thoroughly clean all food-preparation surfaces and utensils with soap and water; avoid contaminating food that will not be cooked, such as salads, with food that must be cooked, such as raw meat or chicken products; and wash hands frequently with soap and water).

6.4.2.3. Advice on personal hygiene

- If you are ill with diarrhea or vomiting, avoid preparing food for others until at least 72 hours after you are free of diarrhea or vomiting.
- Wash hands as described above (section 6.4.2.1).
- If someone in the household has diarrhea or vomiting, clean toilet seats and flush handles, and washbasin taps and washroom door handles with disinfectant after use. If norovirus (which is highly resistant to adverse environmental conditions) is involved, promptly clean contaminated surfaces using a chlorine bleach solution with a

6.4. Control of Secondary Spread

concentration of 1000–5000 ppm (2.5–12.5 fluid ounces of household bleach [5.25%] per gallon of water) or other disinfectant registered as effective against norovirus by the Environmental Protection Agency. Wash and dry clothes, towels, and linens soiled with vomitus or stool at the highest temperature the item will allow.

6.4.3. Exclusion and Restriction of Infected Persons from Settings Where Transmission Can Occur

(including food preparation, health care, and child care)

Persons with an enteric illness can shed viruses, bacteria, or parasites for weeks after symptoms end. Infected skin lesions can be a reservoir for pathogens, which can be transmitted to food through bare-hand contact.

A person who has been ill with vomiting and diarrhea should be excluded from the facility. For norovirus outbreaks, exclusion should continue until the person is free of symptoms for 72 hours. In *Salmonella* and *Shigella* outbreaks, all employees should be cultured whether ill or not and should be restricted until cultures are determined to be negative because infected asymptomatic food workers are possible in restaurant outbreaks. Conversely, little evidence exists for an important role for infected food workers in transmission of *E. coli* O157:H7.

For more pathogen-specific guidance and other information about restricting and excluding food workers, consult the latest version of the FDA Food Code, www.fda.gov/Food/GuidanceRegulation/RetailFoodProtection/FoodCode/default.htm. State and local health departments may not have the legal authority to exclude food workers unless they have acute symptoms. In addition, scientific evidence supporting exclusion of food workers might not be reflected in state or local food codes or might not be available at all. However, if the outbreak investigation and control team believes a public health threat exists, the team should strongly recommend exclusions of food workers. Consult local ordinances and state statutes to understand the legal authorities under which to operate.

One issue to consider in deciding whether to exclude infected persons is the perception that employers might occasionally retaliate against workers, either by having their pay docked during or after the exclusion period or being fired. This can hamper investigations because employees might be reluctant to provide truthful health information to avoid exclusion. Strategies that can mitigate this concern include developing regulations that prohibit retaliation, helping employers identify alternate jobs that ill food workers can perform, and allowing ill employees to trade for shifts when their exclusion has been lifted.

6.4.4. Infection Control Precautions

Work with the food establishment's person-in-charge (PIC) to implement active managerial controls and create a risk-control plan or consent agreement so the PIC knows exactly what steps need to be taken and has committed to control the situation and prevent additional outbreaks. Use of active managerial controls and risk-control plans or agreements can include actions above and beyond those required by regulation (e.g., extra temperature checks and logging of temperature, mandatory glove use by all food workers, routine inquiries of staff before their shifts about whether they have had diarrhea or vomiting in the last 24 hours, additional food-safety training). Ideally, both epidemiologists and environmental health specialists are involved with the PIC in creating this plan or agreement. Important aspects of the plan are a) employee training and b) adequate oversight to ensure employees follow proper procedures.

Educate food workers about the implicated disease (symptoms, mode of transmission, and prevention) and about general infection control precautions.

6.4. Control of Secondary Spread

Reinforce the following:

- The importance of thorough hand-washing and not working when ill;
- Policy of no bare-hand contact with ready-to-eat foods;
- Proper use of gloves and utensils when handling ready-to-eat foods;
- Proper holding temperatures; and
- Proper procedures for rapid cooling and thorough cooking and reheating of foods.

Infection control precautions for hospitalized and institutionalized persons with infectious diarrhea (particularly easily transmissible infections, such as *Salmonella* serotype Typhi, *Shigella*, and norovirus) include:

- Isolation of patients (e.g., in a private room with separate toilet, if possible);
- Barrier nursing, patient care, and janitorial precautions;
- Strict control of the disposal or decontamination of contaminated clothing, surfaces, and bedding; and
- Strict observation of personal hygiene measures (see above).
- A plan for effective clean-up of diarrhea or vomitus. Appropriate guidance, references and educational materials are available at www.cdc.gov/norovirus/preventing-infection.html.

Use chlorine solutions or other approved effective sanitizers or methods (e.g., steam cleaning carpets) rather than standard cleaning chemicals to clean and disinfect all surfaces after a norovirus outbreak.

Recommended practices for infection control frequently are changed and updated. Routinely checking key sources, such as CDC, ensures organizational recommended practices are current.

6.4.5. Prophylaxis

Set up processes with area hospitals, physicians, local health departments, specialty clinics, or other health-care providers to provide prophylaxis if needed. Have tested plans in place for large-scale prophylaxis. During preparations of public communications about prophylaxis, consider the number of people likely exposed and the anticipated response to the prophylaxis offer when planning, including community medical staff, vaccine/product supply, crowd control management, and health department phone staffing.

Develop processes to identify and communicate with persons who might need prophylaxis. Depending on the organism, this might include giving special consideration to protecting high-risk groups. For example, persons with underlying chronic hepatitis B or C might need to be advised to be vaccinated against hepatitis A.

6.5. Communication

6.5.1. With Other Members of the Investigation and Control Teams

Communicate actions taken and outbreak status information to all persons involved in an outbreak investigation, including those in different agencies or different departments within the agency.

Identify and keep key personnel in the implicated food establishment informed, and notify them that they must share any new reports of illness or other new information that could affect the investigation. Illness complaints reported to food establishments about a commercial product can lead to

6.5. Communication

CIFOR Keys to Success: Focus Area 12—Control of secondary spread

Communication
- Agency/jurisdiction has means to alert health-care providers about the outbreak and provide specific information about reporting, treatment, and infection control.
- Agency/jurisdiction has ongoing communication with the public.
- Agency/jurisdiction has preexisting relationships with the media to ensure rapid and accurate communication of information to the public.
- Agency/jurisdiction has staff trained in communicating with the media and risk communications.

Control measures
- Agency/jurisdiction works with settings in which transmission easily can occur to prevent secondary spread (e.g., health care, day care).

Monitoring
- Agency/jurisdiction monitors continued spread of the disease through surveillance and other means.

Making changes
- Agency/jurisdiction debriefs investigators after each outbreak response and refines outbreak response protocols based on lessons learned.
- Agency/jurisdiction has performance indicators related to control of secondary spread from an outbreak and routinely evaluates its performance in this Focus Area.

expansion of a recall if additional product codes are associated with illness.

6.5.2. With Agency Executives and Other Agencies

Ensure that agency heads routinely receive information about the status of the outbreak investigation.

If the outbreak is potentially multijurisdictional, ensure that other relevant agencies and organizations routinely receive status reports. These might include local, state, and federal public health, agriculture, and regulatory agencies. If an outbreak potentially involves a food from a source outside the jurisdiction identifying the problem, notify all appropriate surrounding health jurisdictions, and call the manufacturer and the retail food establishment chain (if one is involved) to determine whether they also have received illness complaints. This early communication might help to identify the source quickly.

In multijurisdictional outbreaks, coordinate messages and information with other agencies so that consumers are not confused. When possible, a single spokesperson should be used to convey information and updates. Jurisdictions should attempt to release information simultaneously and take similar actions, such as recalls and consumer alerts (see Chapter 7).

6.5.3. With the Public

If the public has been informed about an outbreak, periodically issue updates. Recognize that the public obtains news from multiple sources—the Internet, television, radio, social media, and newspapers. Use all available sources to disseminate information. Know the typical deadlines for local news outlets, and try to release information within those timelines.

6.5. Communication

If the public is not receiving needed information from the public health agency, people will get it from other sources (which might not be accurate). The public health agency should be seen as, and act as, the most reliable source of information.

An agency cannot wait until all the facts are available before communicating with the public. People need enough information to be able to make good decisions to protect their health.

Important terms (e.g., risk, bacteria) might seem common but in fact often are misunderstood. Adopt a standardized format for reporting risk information. Communications about foodborne disease risks should be routine (e.g., the same process should be used each time); this helps make the process more familiar and reduces concerns about the message.

In communication planning, adopt standardized scripts for reporting complex procedural or technical information about the investigation and actions the public should take. Test messages to the public, if possible with representatives of the target population.

Certain groups are at higher risk than others for severe illness and poor outcomes from foodborne disease, including infants, pregnant women, and immune-compromised persons. Emphasize safe food-preparation practices and hand-washing to these groups. For example, pregnant women should be advised against consuming unpasteurized dairy products, uncooked lunch meats, and other products with the potential to contain *Listeria*.

6.5.4. With the Industry

Contact the food establishments(s) directly linked to an outbreak as soon as possible, and tell them as much as possible. Tell them about the findings that have implicated their product, and clearly explain the significance of the findings. Seek their help in the investigation, particularly in identifying specific products that might be associated with the outbreak. Food establishment representatives can assist with hypothesis generation and provide useful information about product formulation and distribution. Advise them about possible outbreak control measures, such as voluntary recall of an implicated product. This communication can be complicated by enforcement action that might result from the investigation.

Provide food establishments with the CIFOR Industry Guidelines to assist them in response (http://cifor.us/documents/CIFOR Industry Guidelines/CIFOR-Industry-Guidelines.pdf). These Guidelines provide owners, operators and managers of food establishments with step-by-step approaches to important aspects of outbreak response such as preparation, detection, investigation, control, and follow-up. The CIFOR Industry Guidelines also describe key information to assist industry in understanding what to expect when first notified of potential illnesses and provides tools to help guide industry through the process.

Large firms often have their own staff who understand risk communication and risk management strategies. Some medium-sized and many small firms do not have such expertise and need more guidance. Laws and policies of state and local governments differ for these situations. Understand your own legal framework so you know how to interact with food establishments possibly linked to an outbreak.

The food industry has many trade associations. Some overlap, but in general, every segment of the food industry has an association. State, local, and federal agencies need to establish working relationships with these associations *before* an outbreak. At the time of an outbreak, outreach by government agencies to the appropriate associations with information about the outbreak and about actions members should take is helpful to prevent spread of

6.5. Communication

the current problem or similar problems in their firms. Trade associations can reach large numbers of food facilities and arrange for conference calls and other communications as needed. Similarly, establishing working relationships with food manufacturing facilities in an agency's jurisdiction can help smooth the investigation and control process in an outbreak associated with those facilities.

Outbreaks are teachable moments for the food industry and for the responsible public agencies. When the news media carries stories about an outbreak, communication within the industry is lively, often with misinformation. Food-safety and public health agencies need to dispel misconceptions before they lead to other problems. These agencies also need to explain their response to the outbreak and restore public faith in the future safety of the implicated product. Furthermore, public health agencies need to learn from the food industry about information that could aid in prevention and investigation of future outbreaks.

Food-safety and public health agencies also can collaborate with industry on long-term development of training materials for members and can speak at industry meetings to clarify the prevention message.

Many food facilities and manufacturers have written emergency plans and recall procedures already in place. Regulatory officials might want to review these in advance of any actual event.

6.6. End of the Outbreak

6.6.1. Determining When an Outbreak is Over

Most outbreaks are considered over when two or more incubation periods of the etiologic agent have passed with no new cases. This arbitrary rule might not apply to clusters with low attack rates, and cases from some sources might appear intermittently for years.

6.6.2. Determining When to Remove Restrictions

Remove restrictions when no further risk to the public exists, such as when:

- Risk factors in the facility have been eliminated;
- Ill food workers have recovered and are no longer shedding pathogens (refer to the FDA Food Code for specific recommendations on restricted/excluded employees);
- Tests indicate no further contamination;
- Employees have been taught how to avoid a problem; and
- Managers agree to provide appropriate oversight.

6.6.3. Post-Outbreak Monitoring

Monitor the population at risk for signs and symptoms of the foodborne illness to ensure the outbreak has ended and the source has been eliminated. Consider conducting active surveillance, working with health-care providers to increase their vigilance for cases, and collecting stool samples from the population at risk.

Monitor the implicated foods or food establishments to make sure no further contamination is occurring.

Maintain communication with managers of the implicated food establishment, and give them additional information if it becomes available.

Increase the number of routine inspections at the implicated food establishment to ensure they comply with all required procedures. Old, unsafe practices often are difficult to change,

6.7. After-Action Meetings and Reports

and new practices might need to be used for a substantial time before they become routine. Consider customized training to support the desired behavioral change. Determine whether behavioral change has occurred long term. Monitor the implicated firm's development and implementation of preventive controls.

The outbreak investigation and control team should meet and review all aspects of the investigation. The complexity of the review depends on the size of the outbreak. For a small outbreak associated with a single facility or event, a short written summary may be sufficient. For a large outbreak involving multiple agencies, a formal after-action meeting is appropriate.

A formal after-action meeting should:

- Identify the contributing factors and environmental antecedents of the outbreak and measures (preventive controls) to prevent additional outbreaks at this and other food establishments;
- Identify the long-term and structural control measures, and develop a plan for their implementation;
- Assess the effectiveness of outbreak control measures and difficulties in implementing them;
- Assess whether further scientific studies should be conducted;
- Clarify resource needs, structural changes, or training needs to optimize future outbreak response;
- Identify factors that compromised the investigations, and seek solutions;
- Identify necessary changes to current investigation and control guidelines and development of new guidelines or protocols as required; and
- Discuss any legal issues that might have arisen and the need for new laws to strengthen response (see Chapter 9).

If additional information becomes available in the weeks or months after the outbreak and the official after action meeting, disseminate that information to the outbreak investigation and control team and appropriate external partners.

6.8. Outbreak Report

Prepare reports for all outbreaks. Again, the complexity will depend on the size of the outbreak. For small outbreaks, a simple summary (following a template established by the agency) should suffice. The report can be used to educate staff and to look for trends across outbreaks that can be useful in future investigations.

Use outbreak reports as a continuous quality improvement opportunity. If all the after-action reports say the same thing, then nothing is being corrected.

The final after-action report of a large outbreak should be comprehensive, with information provided by all team participants, and should be disseminated to all participating organizations. Sample outbreak after-action reports are available at the CIFOR Clearinghouse, www.cifor.us/clearinghouse/keywordsearch.cfm.

Given that outbreak reports, especially after-action reports for large outbreaks, are likely to be subject to Freedom of Information Act requests, they should be written with public disclosure in mind. The reports should not identify individuals or other legally nonpublic information unless absolutely necessary. Proper care in writing the report will save time redacting information when the report is released to the public. Some jurisdictions

6.8. Outbreak Report

allow or mandate the inclusion of identifying information, so review state and local laws and policies.

Submit a final report of the outbreak to CDC's National Outbreak Reporting System and National Voluntary Environmental Assessment Information System databases.

6.9. Other Follow-Up Activities

6.9.1. Future Studies and Research

The outbreak investigation findings might indicate the need for future research. For example, investigators might determine that for certain pathogens in certain foods, standard control measures do not seem effective or routine handling practices and their role in outbreaks are not completely understood. Such observations should be considered for in-depth study by the food-safety or public health agency or by research centers. Identifying issues that need follow-up research is important to improving the practice of responses to outbreaks of foodborne diseases.

6.9.2. Publication of Outbreak Results

If something unusual characterized the outbreak (e.g., unusual exposure, presence of a pathogen in a food where it had not previously been reported), the report should be disseminated more widely (e.g., Epi-X, *MMWR*, or other national forum; peer-reviewed journals).

Important lessons learned (such as new investigation methods that proved particularly helpful, control measures that seemed particularly effective, actions taken that seemed to shorten the outbreak) should be published in an appropriate national forum.

6.9.3. Education

An outbreak can identify the need for broad education of the public; the food-service, retail, and food-processing industries; or health-care providers. Public service announcements might be necessary to remind the public about food-preparation precautions. Training for food-service workers and managers and food processors might need to be modified to address specific concerns. Managers need to oversee training of food-service workers and food processors and their use of recommended procedures. Health-care providers might need continuing education focused on diagnosing, treating, or reporting foodborne diseases. Such actions can help prevent future outbreaks or reduce the number of cases or severity of illness during an outbreak.

Trade associations, food-industry organizations and national conferences often request presentations on outbreak investigations. These events provide an opportunity to educate representatives of the food industry, colleagues, and others about investigation procedures, outbreak management, and CIFOR.

6.9.4. Policy Action

Information gained during an outbreak might identify the need for new public health or regulatory policy at the local, state, or federal level. Establishment of different inspection practices, source controls, or surveillance procedures, or of increased control over the recall process might be necessary. Reports of past outbreaks should be analyzed to determine whether multiple outbreaks support the need for new policy. Other public health and environmental health agencies also should be consulted to determine whether concurrence exists on the need for new policy. If so, the issue should be presented to the appropriate jurisdictional authority by using the appropriate policy development processes.

6.10. Multijurisdictional Considerations for Control Measures

Although control measures typically are implemented at the local level, multijurisdictional outbreaks require extensive coordination among agencies to ensure control measures are implemented consistently and are effective (see Chapter 7).

6.11. Indicators/Measures

Key indicators to help assess control measures and the overall success of efforts to halt outbreaks have been developed (see Chapter 8).

6.12. Reference

1 Iowa Department of Public Health. Foodborne Outbreak Investigation Manual. Available at www.idph.state.ia.us/idph_universalhelp/Main.aspx?System=IdphFoodborneDiseaseManual&navigationType=Dynamic (accessed October 8, 2013).