

# Focus Area 7 Worksheet: Epidemiology Investigation

## FOCUS AREA 7: EPIDEMIOLOGY INVESTIGATION

Complete this worksheet if “Epidemiology Investigation” is a high priority Focus Area for efforts to improve foodborne disease outbreak response in your agency/jurisdiction. (NOTE: The term “agency/jurisdiction” refers to the entity for which your workgroup is making decisions. See your completed “Document D: Preliminaries” worksheet for a definition.)

List the individuals participating in the discussion of this Focus Area (and their affiliations).

To help you understand what is included in this Focus Area, review the following goals and keys to success.

### GOALS FOR THE EPIDEMIOLOGY INVESTIGATION:

During an outbreak investigation, agency/jurisdiction staff collect, analyze, and interpret exposure (and other) information from cases (and comparison groups, where appropriate) to determine the etiologic agent, persons at risk, mode of transmission, and the vehicle of the outbreak.

### KEYS TO SUCCESS FOR THE EPIDEMIOLOGY INVESTIGATION:

“Keys to success” are activities, relationships, and resources that are critical to achieving success in a Focus Area. Determining whether an agency/jurisdiction has a particular key to success in place is somewhat subjective. Metrics, such as measures of time (e.g., rapidly, timely, and quickly), have not been defined. Your workgroup should provide its own definitions for these terms, as is appropriate for your agency/jurisdiction, and use its best judgment in deciding whether a particular key to success is fully or partially in place.

#### Staff skills and expertise

- Staff have good interviewing skills and can collect complete and accurate exposure information from cases and controls, where appropriate (or have access to staff in other agencies with this expertise).
- Staff have expertise in epidemiologic study design (or have access to staff in other agencies with this expertise).

#### Outbreak investigation

- Agency/jurisdiction has a written protocol outlining the steps in the epidemiologic investigation of a foodborne disease outbreak. Staff have easy access to the protocol and have been trained in its implementation.
- Staff interview cases about exposures as soon as possible after the case is reported.
- Staff have access to standard epidemiologic questionnaires used by other investigators in similar outbreaks.

#### Communication

- Staff communicate in a timely fashion and coordinate activities with environmental health and laboratory staff.

#### Making changes

- Agency/jurisdiction conducts a debriefing among investigators following each outbreak response and refines outbreak response protocols based on lessons learned.
- Agency/jurisdiction has performance indicators related to the epidemiologic investigation and routinely evaluates its performance in this Focus Area.



## 2. PRIORITIZE CIFOR RECOMMENDATIONS TO ADDRESS NEEDED IMPROVEMENTS.

Having identified activities and procedures in need of improvement, review the CIFOR recommendations related to this Focus Area (listed below). Rate the priority for implementing each recommendation based on its likely impact on foodborne outbreak response at your agency/jurisdiction and available resources. Use a scale of 1 to 5 to rate each recommendation (1=Low priority for implementation and 5=High priority for implementation). If a recommendation is already in place in your agency/jurisdiction, check the appropriate box. If a recommendation is not relevant to your agency/jurisdiction, select N/A. **Refer to the blue underlined section number following each recommendation to view the recommendation as it appears in the CIFOR Guidelines.**

	Already in place	Priority for Implementation or Improvement in Your Agency/Jurisdiction					N/A
		LOW				HIGH	
<b>Staff skills and expertise</b>							
Ensure that the epidemiologic investigator on the outbreak response team has the necessary training and skills to plan and conduct epidemiologic studies during an outbreak investigation (e.g., expertise in interviews, study design, questionnaire development, and data analysis). ( <a href="#">3.2.2.2</a> )	<input type="checkbox"/>	1	2	3	4	5	N/A
Ensure that the epidemiologic investigator knows how to collect clinical specimens and store and transport them properly. ( <a href="#">3.2.2.4</a> )	<input type="checkbox"/>	1	2	3	4	5	N/A
Provide continuing education to the epidemiologic investigator to maintain and improve skills in their specialty. ( <a href="#">3.2.3.4</a> )	<input type="checkbox"/>	1	2	3	4	5	N/A
Train the epidemiologic investigator in the agency's/jurisdiction's outbreak response protocols and the epidemiologic investigator's role in an investigation. ( <a href="#">3.2.3.4</a> )	<input type="checkbox"/>	1	2	3	4	5	N/A
Assemble a reference library with information about foodborne diseases, enteric illnesses, and control measures. Where possible include electronic resources that can be accessed during field investigations. ( <a href="#">3.2.3.3</a> )	<input type="checkbox"/>	1	2	3	4	5	N/A
Assemble a list of resource persons who have expertise in specific disease agents and epidemiologic investigation methodologies. ( <a href="#">3.2.3.3</a> )	<input type="checkbox"/>	1	2	3	4	5	N/A
Exercise outbreak response team members together to ensure that each team member can perform his or her role according to agency-specific protocols and legal authorities and understands the roles and responsibilities of other team members. ( <a href="#">3.2.3.4</a> )	<input type="checkbox"/>	1	2	3	4	5	N/A
Ensure that all outbreak response team members regularly participate in outbreak investigation and control efforts, even if it means working with another jurisdiction because the team's home jurisdiction does not have many outbreaks. ( <a href="#">3.2.3.4</a> )	<input type="checkbox"/>	1	2	3	4	5	N/A
If investigations are infrequent, centralize processes that require substantial experience for proficiency (e.g., case interviews, study design). ( <a href="#">4.2.10.3</a> )	<input type="checkbox"/>	1	2	3	4	5	N/A

Additional ideas:

	Already in place	Priority for Implementation or Improvement in Your Agency/Jurisdiction					
		LOW			HIGH		
<b>Outbreak investigation</b>							
Prepare a written protocol outlining the steps in the epidemiologic investigation of a foodborne disease outbreak. ( <a href="#">3.2.3.3</a> )	<input type="checkbox"/>	1	2	3	4	5	N/A
Have appropriate equipment ( <a href="#">3.3.2.3</a> ) and supplies ( <a href="#">3.3.2.4</a> ) ready for use by the epidemiologic investigator when needed.	<input type="checkbox"/>	1	2	3	4	5	N/A
<i>Data collection</i>							
Use standard forms for collecting exposure information to ensure that pertinent information is collected from all cases. ( <a href="#">3.5.2.1</a> ) ( <a href="#">5.1.2.5</a> )	<input type="checkbox"/>	1	2	3	4	5	N/A
Use standard “core” questions and data elements on data collection forms to enhance data sharing and comparisons across jurisdictions. ( <a href="#">4.2.9.3.2</a> )	<input type="checkbox"/>	1	2	3	4	5	N/A
Develop templates for data collection forms before an outbreak occurs. (For examples, see the CIFOR Clearinghouse at <a href="http://www.cifor.us/clearinghouse/keywordsearch.cfm">www.cifor.us/clearinghouse/keywordsearch.cfm</a> .) ( <a href="#">5.1.2.5</a> )	<input type="checkbox"/>	1	2	3	4	5	N/A
Train interviewers in the use of the standard interview forms and interview techniques. ( <a href="#">3.5.2.1</a> ) ( <a href="#">5.1.2.5</a> )	<input type="checkbox"/>	1	2	3	4	5	N/A
Obtain tools to analyze outbreak data (e.g., Epi Info, SAS) before an outbreak occurs. ( <a href="#">3.5.2.2</a> )	<input type="checkbox"/>	1	2	3	4	5	N/A
Ensure that staff are trained to use these tools. ( <a href="#">3.5.2.2</a> )	<input type="checkbox"/>	1	2	3	4	5	N/A
Ensure that appropriate electronic record management procedures are in place during an outbreak investigation, including routine data backups, off-site redundant storage, and disaster recovery procedures. ( <a href="#">3.5.2.2</a> )	<input type="checkbox"/>	1	2	3	4	5	N/A
Determine how confidential information will be stored and whether and how it can be shared with others in the outbreak response team. ( <a href="#">3.6.2.2</a> )	<input type="checkbox"/>	1	2	3	4	5	N/A
Be familiar with and follow state and federal laws and practices that protect confidential information from disclosure. ( <a href="#">5.1.2.6</a> )	<input type="checkbox"/>	1	2	3	4	5	N/A
Additional ideas:							
<i>Identify etiologic agent (if unknown)</i>							
Contact health-care providers of cases who have sought medical attention to determine if a diagnosis has been confirmed. ( <a href="#">Table 5.1</a> )	<input type="checkbox"/>	1	2	3	4	5	N/A
Interview cases to characterize symptoms, incubation period, and duration of illness to provide clues to a possible etiology. ( <a href="#">Table 5.1</a> )	<input type="checkbox"/>	1	2	3	4	5	N/A
Obtain stool samples from cases and establish an etiology through laboratory testing. ( <a href="#">Table 5.1</a> )	<input type="checkbox"/>	1	2	3	4	5	N/A

	Already in place	Priority for Implementation or Improvement in Your Agency/Jurisdiction					N/A
		LOW				HIGH	
<b>Outbreak investigation</b> (cont'd)							
<i>Identify etiologic agent</i> (if unknown) (cont'd)							
Additional ideas:							
<i>Identify persons at risk</i>							
If an outbreak is related to an event or establishment, obtain a list of persons attending the event or patronizing the establishment during the outbreak period. ( <a href="#">Table 5.1</a> ) Event planners and queries of social media might help identify persons attending an event.	<input type="checkbox"/>	1	2	3	4	5	N/A
If an outbreak is related to an event or establishment, interview persons who attended the event or patronized the establishment to identify cases and determine attack rates by time. ( <a href="#">Table 5.1</a> )	<input type="checkbox"/>	1	2	3	4	5	N/A
If the identified agent is reportable, review recently reported cases to identify possible exposures to the event or establishment. ( <a href="#">Table 5.1</a> )	<input type="checkbox"/>	1	2	3	4	5	N/A
Review foodborne illness complaints to identify undiagnosed cases that could be linked to an outbreak. ( <a href="#">5.2.4.1.4</a> )	<input type="checkbox"/>	1	2	3	4	5	N/A
Alert health-care providers of a possible outbreak and review laboratory reports to identify additional cases. ( <a href="#">Table 5.1</a> ) ( <a href="#">Table 5.2</a> )	<input type="checkbox"/>	1	2	3	4	5	N/A
Ask cases if they know of others who are ill. ( <a href="#">Table 5.2</a> )	<input type="checkbox"/>	1	2	3	4	5	N/A
Depending on the nature of the outbreak, take additional steps to identify cases such as reviewing medical charts at hospitals or physicians' offices, reviewing employee or school absences, reviewing death certificates, surveying the affected population, or asking the public to contact the health department if they think they might have the illness under investigation. ( <a href="#">Table 5.2</a> )	<input type="checkbox"/>	1	2	3	4	5	N/A
Additional ideas:							
<i>Identify mode of transmission and vehicle</i>							
Establish a case definition on the basis of the etiologic agent and/or clinical characteristics of the illness associated with the outbreak with restrictions by person, place, and time. ( <a href="#">Table 5.1</a> ) ( <a href="#">Table 5.2</a> )	<input type="checkbox"/>	1	2	3	4	5	N/A
Characterize cases by person, place, and time, and evaluate this descriptive epidemiology to identify patterns suggestive of particular food items or diets. ( <a href="#">Table 5.2</a> )	<input type="checkbox"/>	1	2	3	4	5	N/A
Collect exposure histories from patients as soon as possible using techniques to improve food history recall. If there are sufficient resources, interview cases with a detailed exposure history questionnaire as they are reported (i.e., before an outbreak has been recognized). ( <a href="#">4.2.10.3</a> ) ( <a href="#">5.2.4.1.2.1</a> ) ( <a href="#">5.2.4.1.1</a> )	<input type="checkbox"/>	1	2	3	4	5	N/A

Already  
in place

Priority for Implementation  
or Improvement in  
Your Agency/Jurisdiction

LOW HIGH

**Outbreak investigation** (cont'd)

*Identify mode of transmission and vehicle* (cont'd)

To improve food history recall, encourage cases to remember what they ate by looking at a calendar for the appropriate period and elaborating on where they ate, with whom, and events associated with the meal. [\(5.2.4.1.1\)](#)

1 2 3 4 5 N/A

To help cases think about all exposures, provide a structured list of places where cases might get food including food pantries, farmers' markets, conference meetings, and caterers. [\(5.2.4.1.1\)](#)

1 2 3 4 5 N/A

To improve food history recall, enlist the help of those preparing meals for case(s) during the period of interest. [\(5.2.4.1.1\)](#)

1 2 3 4 5 N/A

To improve food history recall, obtain cash register or credit card receipts from cases to identify/verify food purchases and places where food was consumed. [\(Table 5.2\)](#) [\(5.2.4.1.1\)](#)

1 2 3 4 5 N/A

To improve food recall, if the subject uses a grocery store shopper card, ask permission to obtain purchase records. Work with stores where cases purchased food to obtain shopper card purchase records. [\(5.2.4.1.1\)](#)

1 2 3 4 5 N/A

Document brand names, product code information, purchase dates, and locations from patients for prepackaged food items. [\(Table 5.2\)](#) [\(5.2.4.1.3\)](#)

1 2 3 4 5 N/A

Explore other sources of information (in addition to product information from cases) such as product distribution data obtained from the food distributor [\(4.2.4\)](#) or lists of suppliers from retailers, restaurants, and institutions. [\(5.2.4.1.3\)](#)

1 2 3 4 5 N/A

Use a dynamic cluster investigation process to develop hypotheses about an outbreak. As new exposures are suggested during interviews with cases, re-interview previously interviewed cases to uniformly assess their exposure to the new exposure. Assess the new exposure for all newly reported cases. [\(5.2.4.1.2\)](#)

1 2 3 4 5 N/A

Interview appropriate non-ill persons to obtain exposure information for comparison groups in case-control or cohort studies. [\(Table 5.1\)](#) [\(Table 5.2\)](#)

1 2 3 4 5 N/A

Interview non-outbreak-associated ill persons (i.e., cases with microbial agents other than the agent under investigation from the same time period) to obtain exposure information for comparison groups for case-case analytic studies. [\(Table 5.2\)](#) [\(5.2.4.1.2.1\)](#)

1 2 3 4 5 N/A

Compare exposure frequencies among cases against known or estimated background exposure rates, such as those found in the FoodNet Atlas of Exposures at [www.cdc.gov/foodnet/studies/population-surveys.html](http://www.cdc.gov/foodnet/studies/population-surveys.html), to identify suspected food items using a binominal distribution probability model. [\(Table 5.2\)](#) [\(5.2.4.1.5\)](#)

1 2 3 4 5 N/A

Already  
in place

Priority for Implementation  
or Improvement in  
Your Agency/Jurisdiction

LOW HIGH

**Outbreak investigation** (cont'd)

*Identify mode of transmission and vehicle* (cont'd)

In the absence of survey data or data from a control group, use common sense estimates of the prevalence of a given exposure to identify exposures of interest among cases. ([5.2.4.1.5](#))

1 2 3 4 5 N/A

Conduct an investigational traceback to determine whether a suspected food vehicle from multiple cases has a distribution or other point in common. Because traceback investigations can be resource intensive, the decision to conduct one should be based on input from public health and regulatory agencies. ([5.2.4.1.7](#))

1 2 3 4 5 N/A

Additional ideas:

*Determine potential for ongoing transmission*

Create an epidemic curve, and on the basis of the agent, incubation period, and likelihood of secondary spread, evaluate the course of the epidemic to determine whether cases may still be occurring. ([Table 5.1](#)) ([Table 5.2](#))

1 2 3 4 5 N/A

If the outbreak appears to be ongoing, continue surveillance and review potential abatement procedures. ([Table 5.1](#)) ([Table 5.2](#))

1 2 3 4 5 N/A

Additional ideas:

**Communication**

Ensure that the epidemiologic investigator knows the other members of the outbreak response team before an outbreak occurs. ([3.6.2.2](#))

1 2 3 4 5 N/A

Establish and use routine procedures for communicating among outbreak response team members and their organizational units before an outbreak occurs. ([3.6.2.2](#))

1 2 3 4 5 N/A

Maintain close communication and coordination with members of the outbreak response team during an investigation. Update all members of the outbreak response team daily. Make sure suspicious new exposures are adequately considered by all team members and that the public information officer is routinely updated to ensure appropriate messaging to the public and media. ([5.1.2.3](#)) ([5.2.5](#)) ([6.5.1](#))

1 2 3 4 5 N/A

Submit preliminary reports of outbreaks to CDC's National Outbreak Reporting System (NORS) while the investigation is ongoing to identify potentially related outbreaks occurring in multiple places and facilitate further investigation of the outbreaks. ([5.2.9](#))

1 2 3 4 5 N/A

Additional ideas:

	Already in place	Priority for Implementation or Improvement in Your Agency/Jurisdiction					
		LOW			HIGH		
<b><u>Making changes</u></b> (cont'd)							
Participate in a debriefing following each outbreak investigation with all members of the outbreak response team to identify lessons learned and compare notes on ultimate findings. Identify factors that compromised the investigation and clarify changes to procedures, resources, training, and agency structure to optimize future investigations. ( <a href="#">6.7</a> ) ( <a href="#">3.2.3.4</a> ) ( <a href="#">5.2.8</a> )	<input type="checkbox"/>	1	2	3	4	5	N/A
Work with outbreak response team to summarize investigation findings, conclusions, and recommendations in a written report, consistent with the size and complexity of the investigation including lessons learned and action items for follow-up and quality improvement. ( <a href="#">3.7.2</a> ) ( <a href="#">5.2.9</a> ) ( <a href="#">6.8</a> )	<input type="checkbox"/>	1	2	3	4	5	N/A
Work with outbreak response team to submit summary data about the outbreak to CDC's NORS database using CDC's form 52.13. Make every effort to complete both Part 1 and Part 2. ( <a href="#">5.2.9</a> )	<input type="checkbox"/>	1	2	3	4	5	N/A

Additional ideas:

