

# Focus Area 7 Worksheet: Epidemiology Investigation

## Focus Area 7: Epidemiology Investigation

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, modes 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 believed to be 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.

List the persons participating in the discussion of this Focus Area and list their affiliations

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**1. DESCRIBE YOUR CURRENT ACTIVITIES AND PROCEDURES IN THIS FOCUS AREA.**

Considering the keys to success on the previous page, describe your agency’s/jurisdiction’s current activities and procedures in this Focus Area. Refer to written protocols, if available, and materials related to ongoing efforts in capacity development or quality improvement (e.g., Epidemiology and Laboratory Capacity Grants). As you list current activities and procedures related to this Focus Area, indicate those that might need work to improve your agency’s/jurisdiction’s response to foodborne disease outbreaks.

Activity/Procedure	Needs Improvement? ✓
	<input type="checkbox"/>
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## 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 hyperlinked section number following each recommendation to view the recommendation as it appears in the CIFOR Guidelines.**

	Already in place	Priority for Implementation or Improvement					N/A
		LOW		HIGH			
<b>Staff skills and expertise</b>							
Ensure that the epidemiologic investigator on the outbreak response team has the necessary skills to plan and conduct epidemiologic studies during an outbreak investigation (e.g., expertise in case 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
Provide continuing education to the epidemiologic investigator to maintain and improve skills in their specialty. ( <a href="#">3.2.3</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</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. When 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 team members understand and can perform their roles and understand 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="#">4.2.10.1</a> )	<input type="checkbox"/>	1	2	3	4	5	N/A

Additional ideas:

	Already in place	Priority for Implementation or Improvement					
		LOW			HIGH		
<b>Outbreak Investigation</b>							
Prepare a written protocol outlining the steps in the epidemiologic investigation of a foodborne disease outbreak. ( <a href="#">3.2.2.2</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 standardized forms for collecting exposure information to ensure that pertinent information is collected from all cases. ( <a href="#">5.1.2.5</a> )	<input type="checkbox"/>	1	2	3	4	5	N/A
Use standardized “core” questions and data elements on data collection forms to enhance data sharing and comparisons across jurisdictions. ( <a href="#">5.1.2.5</a> )	<input type="checkbox"/>	1	2	3	4	5	N/A
Develop templates for data collection forms before an outbreak occurs. (See the CIFOR Clearinghouse for examples.) ( <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> )							
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</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
Additional ideas:							

	Already in place	Priority for Implementation or Improvement					
		LOW			HIGH		
<b>Outbreak Investigation</b> (cont'd)							
<i>Identify persons at risk</i>							
Identify additional cases by alerting health-care providers, reviewing laboratory reports and medical charts, asking cases if they know of others who are ill, reviewing employee or school absences, reviewing death certificates, surveying the affected population, or asking the public to contact the health department if they have the illness under investigation. ( <a href="#">Table 5.1</a> and <a href="#">5.2</a> )	<input type="checkbox"/>	1	2	3	4	5	N/A
If an outbreak is related to an event or establishment, obtain a list of persons attending the event or a list of persons patronizing the establishment during the outbreak period. ( <a href="#">Table 5.1</a> )	<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
Additional ideas:							
<i>Identify mode of transmission and vehicle</i>							
Establish a case definition based on the etiologic agent and/or clinical characteristics of the illness associated with the outbreak with restrictions by time, place, and person. ( <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 after they are reported by using techniques to improve food history recall. ( <a href="#">5.2.4.1.1</a> )	<input type="checkbox"/>	1	2	3	4	5	N/A
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. ( <a href="#">5.2.4.1.1</a> )	<input type="checkbox"/>	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. ( <a href="#">5.2.4.1.1</a> )	<input type="checkbox"/>	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. ( <a href="#">Table 5.2</a> ) ( <a href="#">5.2.4.1.1</a> )	<input type="checkbox"/>	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. ( <a href="#">5.2.4.1.1</a> )	<input type="checkbox"/>	1	2	3	4	5	N/A
Work with grocery stores where cases purchased food to obtain shopper card purchase records to identify/verify food purchases. ( <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

LOW                      HIGH

**Outbreak Investigation** (cont'd)

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

Document brand names and product code information for prepackaged food items consumed by cases. ([Table 5.2](#))  1 2 3 4 5 N/A

Explore other sources of information (in addition to interview information from cases) such as product distribution data. ([4.2.4](#))  1 2 3 4 5 N/A

If resources are sufficient, interview cases with a detailed exposure history questionnaire as they are reported (i.e., before an outbreak has been recognized). ([4.2.10.3](#)) ([Table 5.2](#))  1 2 3 4 5 N/A

When resources are insufficient to conduct detailed exposure history interviews at the initial report, collect information about limited high-risk exposures associated with the pathogen when the case is reported followed by a more detailed interview if a cluster is recognized. ([5.2.4.1.2.2](#))  1 2 3 4 5 N/A

If conducting detailed exposure history interviews with cases only after a cluster is identified, either a) use the results for hypothesis generation with subsequent testing of those hypotheses in a controlled study or b) use the detailed exposure history questionnaire on an appropriate set of controls at the same time, thereby combining hypothesis generation and testing. ([5.2.4.1.2.2](#))  1 2 3 4 5 N/A

Use a dynamic cluster investigation process to generate hypotheses about an outbreak. Interview initial cases within a cluster using a detailed exposure history questionnaire and systematically re-interview those same cases as new exposures are identified. ([5.2.4.1.2](#))  1 2 3 4 5 N/A

Interview appropriate non-ill persons to obtain exposure information for comparisons in case-control or cohort studies. ([Table 5.2](#)) ([5.2.4.1.2.1](#))  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) to obtain exposure information for controls 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 ([http://www.cdc.gov/foodnet/studies\\_pages/pop.htm](http://www.cdc.gov/foodnet/studies_pages/pop.htm)) to identify suspected food items. ([Table 5.2](#)) ([5.2.4.1.4](#))  1 2 3 4 5 N/A

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. ([5.2.4.1.4](#))  1 2 3 4 5 N/A

Additional ideas:

Already in place      Priority for Implementation or Improvement

**Outbreak Investigation** (cont'd)

*Determine potential for ongoing transmission*

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

	Priority for Implementation or Improvement					N/A
	LOW			HIGH		
	1	2	3	4	5	
<input type="checkbox"/>	1	2	3	4	5	N/A

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

<input type="checkbox"/>	1	2	3	4	5	N/A
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Additional ideas:

**Communication**

Ensure that outbreak response team members know each other before an outbreak occurs. ([3.6.2.2](#))

<input type="checkbox"/>	1	2	3	4	5	N/A
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Establish and use routine procedures for communicating among outbreak response team members and their organizational units before an outbreak occurs. ([3.6.2.2](#))

<input type="checkbox"/>	1	2	3	4	5	N/A
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Maintain close communication and coordination among members of the outbreak response team during an investigation. ([5.1.2.3](#)) ([5.2.5](#))

<input type="checkbox"/>	1	2	3	4	5	N/A
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Communicate actions taken and new outbreak information to all members of the outbreak response team in a timely manner. ([6.4.1](#)) ([5.2.5](#))

<input type="checkbox"/>	1	2	3	4	5	N/A
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Participate in daily meetings with the outbreak response team to update the entire team. Make sure suspicious new exposures are adequately considered by all team members. ([5.2.5](#))

<input type="checkbox"/>	1	2	3	4	5	N/A
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Submit preliminary reports of outbreaks to CDC's National Outbreak Reporting System while the investigation is ongoing to identify potentially related outbreaks occurring in multiple places and facilitate further investigation of the outbreaks. ([5.2.9](#))

<input type="checkbox"/>	1	2	3	4	5	N/A
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Additional ideas:

**Making changes**

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. ([6.6](#)) ([3.2.3](#)) ([5.2.8](#))

<input type="checkbox"/>	1	2	3	4	5	N/A
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### 3. MAKE PLANS TO IMPLEMENT SELECTED CIFOR RECOMMENDATIONS.

For each CIFOR recommendation selected in the previous step (or idea formulated by the Workgroup), identify who might take the lead in implementing the recommendation and the timeframe for implementation (e.g., a specific completion date or whether the change is likely to require short-, mid- or long-term efforts). If certain actions must precede others, make a note of this and adjust the timeframe. In addition, consider factors that might positively or negatively influence implementation of the recommendation and ways to incorporate the recommendation into your agency's/jurisdiction's standard operating procedures.

CIFOR recommendations or other ideas from previous step	Lead person	Timeframe for implementation	Notes (e.g., necessary antecedents, factors that might influence implementation, ways to incorporate the recommendation into standard operating procedures)

Date worksheet completed \_\_\_\_\_