A silhouette of a person holding a magnifying glass

Description automatically generated

***E. coli***

**Trainer Guide**

**Version 1.0**

**About this Guide**

This Trainer Guide provides a master reference document to help the Trainer to deliver Understanding the Root Cause of an Outbreak: *E. coli*.

Have this guide printed and in front of you for all deliveries. It is imperative that the guide is printed in color in order to not miss important cues in the text.

**What you will find in the guide**

This Trainer Guide is a comprehensive package that contains all facilitation materials for the Training program, including:

* checklists of necessary materials and resources (slides, web page addresses, etc.)
* presentation scripts and key points
* instructions for managing time and discussions
* guidelines for the Producer to support the Trainer
* key indicators to help facilitate virtual delivery, when applicable

The sessions are designed to support participant’s interest, encourage activity, and leverage the use of technology during virtual delivery, with the Trainer and one another. Chat and verbal feedback should be encouraged during virtual delivery. In preparation for each session, review the guide and enhance or adjust based on audience needs.

**Exercises / Activities**

It is advised that groups are not composed of more than 8 people during breakout exercises or activities. An “Answer Key” is provided to participants at the end of an exercise or activity. Answers are reviewed after each activity and an answer key is provided to participants at the end of the session.

**NOTE**

The Workbook provided to participants is theirs to keep. Encourage participants to use their Workbook to take notes.

The following training is suggested PRIOR to attending the Learning Lab:

* **From Inspector to Investigator: Finding the Factors that Lead to Foodborne Outbreaks** [https://www.youtube.com/watch?v=pWEywTiX3Sw] *(An introduction to contributing factors.)*
* **EATS** training [https://www.cdc.gov/nceh/ehs/elearn/eats/index.html] *(A lengthy course that provides a good introduction to skills needed to investigate outbreaks of foodborne illness in restaurants. This course is commonly recommended for new investigators.)*
* The **Contributing Factor Definitions** [https://www.cdc.gov/nceh/ehs/nears/cf-definitions.htm] and **Environmental Antecedent** (*Field Guide to Identifying Root Causes*) [https://www.cdc.gov/nceh/ehs/nears/docs/field-guide-to-identifying-root-causes-508.pdf] resources mentioned in the Workbooks are publicly available. For instructor-led sessions, provide a printout of at least two (2) per group table (pod).
* QR Codes are included in the Contributing Factor Definitions and Environmental Antecedent resource materials.

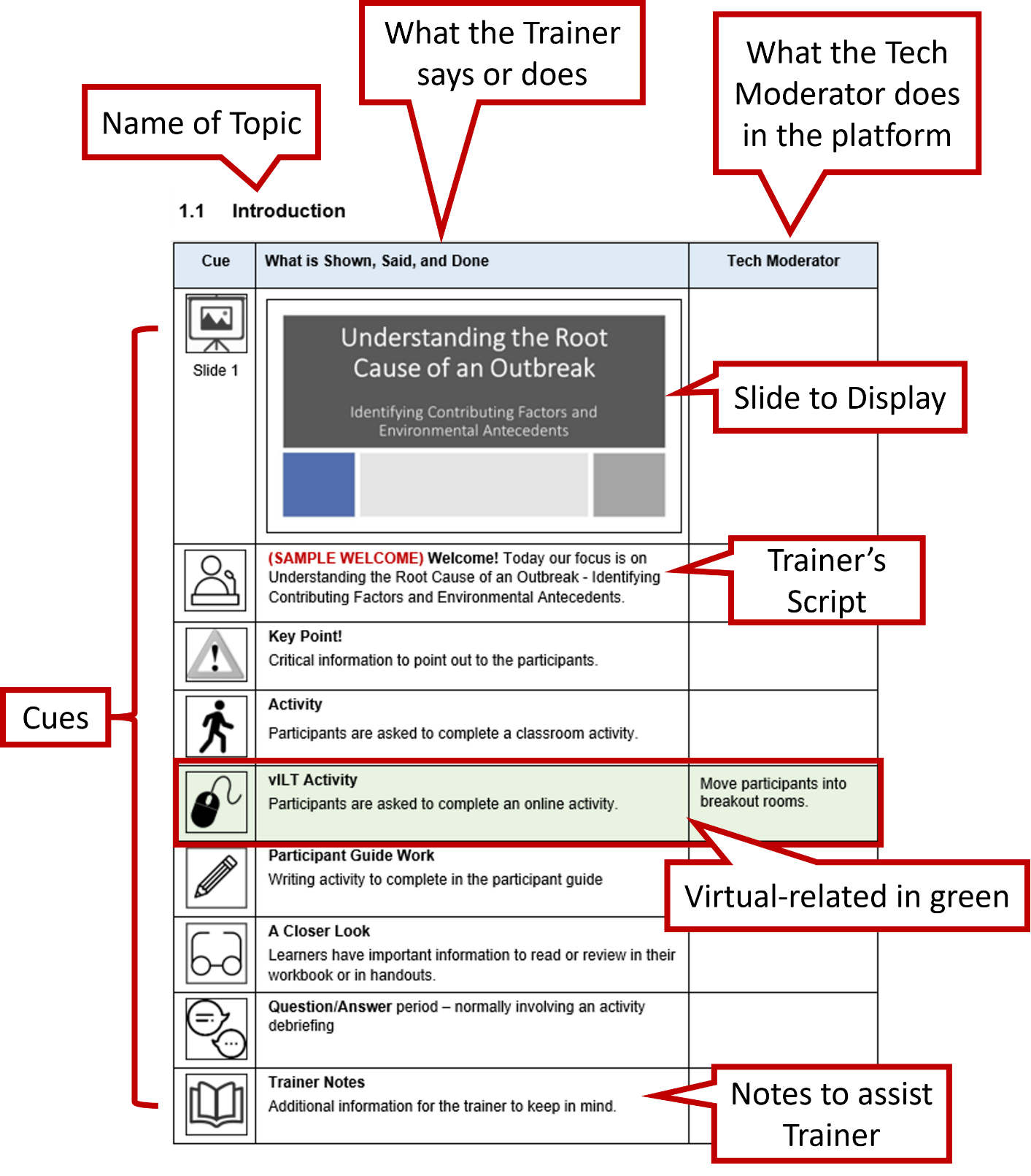
**What you will NOT find in the guide**

This guide assumes that the Trainer is familiar with the synchronous delivery platform/technology. This guide does not include technical directions for the use of such technology.

See the platform’s manual or guide for assistance with the technology.

**How the guide is laid out**

The page format is arranged to assist you in facilitating, in the following ways:



Getting Started

Using the Trainer Guide

|  |  |
| --- | --- |
| speaker icon | How is the text laid out in this Trainer Guide?  Every action in the training is described in this guide by a text block like this one, with a “cue” icon in the left-margin, a title line, followed by information. The icons are designed to help catch your eye and draw quick attention to what to do. In this example, the icon to the left is an indicator that the trainer will say something. The title line is a descriptive topic label followed by a script, instruction, or key points to address with participants. A complete list of the visual cue icons used in this guide is provided below.  **Tech Moderator**  The tech moderator has a critical role in a virtual setting. The role of a Tech Moderator is to make sure that the platform and settings are correct for the course to function smoothly for both the instructor and the participants. They communicate instructions using simple language and ensure a smooth virtual experience. The Tech Moderator will review all the details with the training Trainer prior to the session to walk through the flow, activities, run a final tech check, and discuss any backup plans.  The Tech Moderator works collaboratively with the Trainer to assist attendees in joining the session, moderating break out rooms, and monitoring the chat area for technical questions. Additionally, the Tech Moderator may assist with ensuring documents are successfully uploaded to the chat area.  Instructions for the Tech Moderator are described in this guide under the Tech Moderator column.  Ideally, the Trainer will introduce the Tech Moderator in the beginning to make sure all participants know who to turn to for potential technology issues. |

Graphic Cues

|  |  |
| --- | --- |
| slide icon | Slide to be shown. |
| speaker icon | **Instructor speaks.** |
| **notes pages icon** | **Instructor Notes** |
| eyeglasses icon | **A Closer Look**  Learners have important information to read/review. |
| pencil icon | **Participant Guide Work**  Writing activity to complete in the participant guide |
| **alert icon** | **Key Point!**  Critical information to note |
| **conversation bubbles icon** | **Question/Answer** period – normally involving an activity debriefing |
|  | **Activity**  Participants are asked to complete an activity. |
|  | **Shaded areas apply to vILT delivery format** |
| document icon | **Resource or Quick Reference Guide (Give the Name)**  A Quick Reference Guide is available |

Table of Contents

1 Understanding the Root Cause of an Outbreak 9

1.1 Identifying Contributing Factors and Environmental Antecedents 9

1.1.1 Introduction 9

1.1.2 Outbreak Investigations 12

1.1.3 Investigative Process 13

1.1.4 Environmental Assessments 14

1.1.5 Tabletop Exercise 1 18

1.1.6 Investigative Process Overview 25

1.1.7 Tabletop Exercise 2 28

1.1.8 Investigative Process Overview 36

1.1.9 Tabletop Exercise 3 37

1.1.10 Take Home Points 41

Appendix A Terminology 45

Appendix B Resources 46

Appendix C Level 2 Evaluation Questions 48

Appendix D Questions to Facilitate Engagement 49

Appendix E (SAMPLE) Worksheet for Sandbox Time 50

# Understanding the Root Cause of an Outbreak

## Identifying Contributing Factors and Environmental Antecedents

### Introduction

| **Cue** | **What is Shown, Said, and Done** | **Tech Moderator** |
| --- | --- | --- |
|  | **vILT Start-up.** | Start the platform virtual meeting.  Set the Host and Co-hosts.  Mute attendees on entry.  Ensure attendees can’t unmute.  Make sure no one else can present.  Check audio & video with presenter(s).  Introduce yourself and your role.  Share contact information for any possible technical matters  Display the slide.  Pass the lead to the lead Trainer. |
|  | **Activity – Practice Use of Chat and Reaction Features**  Participants are asked to test their use of the chat area by posting their location. | Monitor the chat area for potential questions or technical issues. |
| **alert icon** | **Key Point!**  Trainer takes the lead over sharing and advancing slides.  Review any logistical housekeeping matters, such as:   * breaks * messages (phone, text, emergencies, etc.) * introduce/review training Resources |  |
| document icon | **Resource**  Resources to be referenced during the training:   * Workbook * IAFP Key A * CIFOR Agent List * Contributing Factors: NEARS Contributing Factor Definitions | EHS | CDC * Environmental Antecedent Field Guide | * Be prepared to post documents in chat or email them directly to participants who may be missing a resource. |
| slide icon  Slide 1 |  |  |
| **speaker icon** | **Welcome!** Today our focus is on Understanding the Root Cause of an Outbreak - Identifying Contributing Factors and Environmental Antecedents. |  |
| slide icon  Slide 2 |  |  |
| **speaker icon** | This PowerPoint and the resources we’ll go over has been a collaboration between the CDC and state and local jurisdictions who are part of the Environmental Health Specialists Network, also known as EHS-Net. EHS-Net is a collaborative forum of environmental health specialists that researches restaurant food safety policies and practices. You can see the current EHS-Net sites on the map on the screen. |  |
| slide icon  Slide 3 |  |  |
| **speaker icon** | *(Review the training learning objectives and introductory section from the Learner Guide.)*  Throughout this training you will:   * Identify and utilize resources and tools to aid in conducting an outbreak investigation * Gain skills and abilities to use evidence and findings from an environmental assessment to identify outbreak contributing factor(s) * Practice asking the “5 whys” to understand why those contributing factors occurred * Employ critical thinking to identify appropriate environmental antecedents * Describe best control measures to prevent future outbreaks   We’ll use scenarios and give you opportunities to complete exercises to reinforce steps. And finally, we’ll review together the processes and give you plenty of opportunity to offer contributions about your experiences. |  |
| slide icon  Slide 4 |  |  |
| **speaker icon** | So, here’s the plan for today. We’re going to be walking you through some investigation principles and newly developed resources and then using them to work through an outbreak scenario that is based on real life events. You’ll also be able to work in a group through 3 exercises. |  |
| eyeglasses icon | A Closer Look  You are encouraged to closely review your Participant Guide as you will use it as a workbook that you will be taking with you. Review any handouts you are given as well. |  |

### Outbreak Investigations

|  |  |  |
| --- | --- | --- |
| **Cue** | **What is Shown, Said, and Done** | **Tech Moderator** |
| slide icon  Slide 5 |  |  |
| speaker icon | Of course, as you know, outbreaks involve an agent, the environment, and a host. ​  And their investigations require collaboration from epidemiology, laboratory, and environmental health. ​  Today we’re focusing on guidance for the environmental health specialist to gather data on the environment which allowed the agent to infect the host. When we understand why this happened, we can work on prevention for the future. |  |

### Investigative Process

|  |  |  |
| --- | --- | --- |
| **Cue** | **What is Shown, Said, and Done** | **Tech Moderator** |
| slide icon  Slide 6 |  |  |
| speaker icon | This is a great visual of how we work through several layers to get to the root cause of the outbreak and ultimately work to prevent the outbreak from happening again. The What is typically the agent, which comes from the Lab or Epi. Then, the environmental health specialist works to understand how and why it happened, and what underlying scenarios were in place allowing it to happen. Let’s pair this with an example. |  |
| reading eyeglass icon | A Closer Look  Carefully review the different factors in your participant guide that are considered when trying to understand what, how, and why an outbreak happened. |  |
| slide icon  Slide 7 |  |  |
| speaker icon | Ok, so here let’s go through a classic outbreak scenario. Maybe the what is - *Salmonella* in the salad. Typically, the general public thinks this is where the investigation stops-great, you found it, the end. But we really want to dive in deeper. So, with further investigation we find that maybe the bowl used to marinate the raw chicken wasn’t cleaned and sanitized properly before being used again to dress the salad. That’s our contributing factor, the how. Again, some people might think that this would be the end of the investigation. But we want to dive deeper again. Why was this even possible when we know that’s dangerous? Ok, because maybe they have new staff coming in all the time without proper training. Those are our environmental antecedents, the why. Now we have a really clear idea of what’s going on in this kitchen and what control measures to push for to prevent it from happening again. |  |

### Environmental Assessments

| **Cue** | **What is Shown, Said, and Done** | **Tech Moderator** |
| --- | --- | --- |
| **slide icon**Slide 8 |  |  |
| speaker icon | The environmental health specialists’ main tool for figuring out how and why (the contributing factor and environmental antecedent) is the environmental assessment. An environmental assessment is a structured investigation the environmental health specialist performs.  Environmental assessments are different from routine inspections because they are targeted; they go in with a specific idea as to what may have caused the outbreak and are looking for information to confirm or disprove that hypothesis.  Environmental assessments can include but are not limited to:   * Interviewing staff, such as managers and food workers * Observing food prep and cooking * Reviewing relevant records, such as cooling logs, inventory receipts, etc. * Taking food samples or swabbing surfaces in the kitchen. |  |
| slide icon  Slide 9 |  |  |
| speaker icon | The focus of the observation will vary depending on what information is known when you go in. For example, if you have an agent or pathogen identified but no known food exposure, then you’ll focus on the risk factors for that pathogen. For example, if you know it’s listeria monocytogenes, you’ll look at cleaning practices of slicers, long-term refrigeration practices, and expiration dates. But if it’s Clostridium perfringens, you’ll look at cooking and cooling practices.  Other times, you may know the food item but not the agent, in which case you’ll work through a food flow of that item, starting from when it enters the facility to when it is served to the customer. |  |
| slide icon  Slide 10 |  |  |
| speaker icon | When interviewing, things to keep in mind:   1. What was going on during the time of exposure when the individuals got sick? Were there any major events or emergencies? Who was working? Were there any menu or process changes? 2. Keep the hypothesis in mind – if the question isn’t going to give us information we need; skip it! 3. Discuss employee health – were any employees out sick around that time? How about in the days before or after? Was anyone sick at work? 4. Empower the managers – they know their restaurant is the best. Ask them what they think might have happened. Develop a rapport with them and establish trust so they are more inclined to share information- Both of you don’t want to get more people sick! 5. Ask 5 why’s – Continue asking probing questions, the more you ask the better the chances you get to the underlying cause |  |
| slide icon  Slide 11 |  |  |
| speaker icon | A major resource for getting your investigation program running is the CIFOR Guidelines for Foodborne Disease Outbreak Response. CIFOR also created the Outbreaks of Undetermined Etiology Agent List which outlines pathogens’ symptoms, incubation periods, and the notable exposures to focus on. This is great for helping you develop your hypothesis and focus your activities before you go into the restaurant to conduct the environmental assessment. In the first exercise, you will have the opportunity to apply this guide to the outbreak. |  |
|  | **vILT** | Drop the CIFOR Outbreaks of Undetermined Etiologies Agent List and/or the link into Chat. |
| document icon | Resource   * CIFOR Guidelines for Foodborne Disease Outbreak Response (https://cifor.us/downloads/clearinghouse/CIFOR-Guidelines-Complete-third-Ed.-FINAL.pdf) * CIFOR Outbreaks of Undetermined Etiology Agent List (http://cifor.us/uploads/resources/CIFOR-OUE-Agent-List\_FINAL.pdf) |  |
| slide icon  Slide 12 |  | * Continue monitoring the chat area for potential questions or technical issues. * Zoom in on the details of the table if the trainer requests. |
| speaker icon | Here’s another free resource available to you for scoping your focus when you conduct your environmental assessment. Your epi or lab team may help identify the agent or pathogen. Then you can review information about the pathogen on the IAFP keys to understand the risk factors. There are keys for many different implicated food items and processes, which are then broken down into more specific food items and pathogens.  We’re focusing on the retail food environment, but it could be used for earlier stages in the food process, such as a manufacturer or processor.  Let’s use the Example of *Salmonella* in salad – we can see that we should be focusing on cross-contamination, improper cleaning of equipment, inadequate refrigeration, prolonged storage, and holding temperatures. |  |
| **alert icon** | **Key Point!**  Carefully review the Key located in the top left corner of the IAFP Resource for Identifying Contributing Factors |  |
|  | **vILT** | * Drop the link to the IAFP Keys into Chat. |
| document icon | **Resource**   * IAFP Keys: https://www.foodprotection.org/upl/downloads/publications/other/free-procedures-keys.pdf |  |

### Tabletop Exercise 1

| **Cue** | **What is Shown, Said, and Done** | **Tech Moderator** |
| --- | --- | --- |
| slide icon  Slide 13 |  |  |
| speaker icon | **Introduce Tabletop Exercise 1 Activity**  As we mentioned at the beginning, we’ll be walking through one outbreak scenario, and we’ll have three exercises to complete. |  |
| reading eyeglass icon | A Closer Look   * Find your Workbook and open it up to the first page which should provide information on the outbreak. * This Workbook is yours to take, so please write in it and take notes if you’d like. |  |
| slide icon  Slide 14 |  |  |
| speaker icon | You’ll use the CIFOR and IAFP resources which we just went over, to think about the outbreak may have happened.  Please work with your group for about 10 minutes then we’ll discuss it as a group. The questions you need to answer on page 4 will also be displayed on the screen |  |
| **alert icon** | **Key Point!**  Break participants into groups. **Remember:** Try to limit the group size to no more than eight (8).   * It is highly recommended to use ONE scenario per learning lab. * Ensure the questions remain displayed for each group to see. * Invite group members to introduce themselves, and begin reading information in the Workbook. * Groups should work together to answer questions in exercise 1. |  |
|  | **vILT** | Place participants into breakout rooms. |
|  | **Activity – Tabletop Exercise 1**   * Use the outbreak information, CIFOR and IAFP resources, and keys from your Workbook in this next exercise. * When we break, you’ll review the outbreak information on **page 2**. |  |
| reading eyeglass icon | A Closer Look   * Resources are on **page 3** of your Workbook. * Answer the **question** on **page 4** about what information you still need to collect. |  |
| slide icon  Slide 15 |  |  |
|  | **vILT** | * Ensure workbook questions appear in each breakout group.   Trainer(s) / Tech Moderator should:   * Bounce from breakout room to breakout room. * Cover any housekeeping or instructions for breakout rooms. * Unmute groups so they can discuss * Announce a two-minute warning. * End breakout session.   At the end of the breakout session:   * Return participants to the main room. * Pass the lead back to the Trainer. |
| **notes pages icon** | Instructor Note  Remind participants to keep in mind the Tabletop Exercise 1 Questions as you guide them through a review of the scenario. |  |
| slide icon  Slide 16 |  |  |
| speaker icon | *(Display the Scenario Review – Slide 16.)*  First, let’s review the information we have:  **Outbreak Identification:**   * 3 *E. coli* 0157:H7 isolates were identified on October 10th. * Speaker, please make quick note about difference between STEC and *E. coli* * Interviews of the cases revealed all ate from the same restaurant between September 12th and September 30th. Upon this notification, environmental health was contacted, and an outbreak investigation was initiated. * We also learned that the meals were from the soft openings of a new restaurant. The restaurant had not opened yet and was using the soft opening to pilot their menu and acclimate the staff to the establishment’s operations. * The restaurant served Mediterranean dishes such as Greek salads, hummus plates, beef, chicken, and falafel gyros, and spanakopita.   **Epi Findings:**   * Cases were identified through routine lab surveillance and interviews with restaurant patrons identified through credit card receipts and a case-control study was conducted. * Confirmed cases were defined as a person who tested positive for STEC at a clinical laboratory after eating at the restaurant. Probable cases were defined as a person with diarrhea (≥ 3 loose stools in a 24-hour period) that was either bloody or at least 3 days in duration after eating at the restaurant. * Interviews were conducted with 38 patrons. Eleven cases, eight laboratory-confirmed and three probables, were identified. * The most common symptoms reported were abdominal pain/cramping (10) and diarrhea (10). * Four patrons were hospitalized due to their illness. * The median incubation period was 3 days (range, 2 to 16 days). The median duration of illness was 7 days (range, 2 to 25 days). * Case-control findings found that consuming any falafel was significantly associated with illness. | Continue monitoring the chat area for potential questions or technical issues throughout this review period. |
| slide icon  Slide 17 |  |  |
| speaker icon | Let’s also look at the IAFP key, which explains situations that likely contributed to outbreaks of foodborne diseases when mixed foods were implicated as vehicles. If we look on the *E. coli* line and under Retail Store/Food Service/Home, we can see many factors to consider including:   * heat process failure, which is the principal factor to consider * cross contamination * improper cleaning of equipment * inadequate refrigeration * temperature holding issues * improper hot holding and cooling are also potential factors to consider | **Optional:** Re-drop the link to the IAFP Keys into Chat. |
| slide icon  Slide 18 |  |  |
| speaker icon | Let’s discuss Exercise 1  **Observations (What we want to see during site visit; this gives us an idea about normal practices but practices may have been different during time of exposure)**   * Preparation and handling of implicated food * Cook temperatures of foods * Hand hygiene practices * Cross-contamination potential * Other poor food safety practices.   **Record Review (What we would ask to view during site visit during time of exposure)**   * Employee illness logs * Credit card receipts * Cooking temperature logs * Invoices for products * Cleaning and sanitizing schedules   **Interview (What we would want to ask manager and food workers about during site visit; we especially want to ask staff who were present during time of exposure)**   * Illness history (customers and employees) * Cleaning and sanitization practices * Information to understand food flow for implicated food item * Employee health policies * Employee food safety knowledge * Unusual circumstances (loss of power, sewage back-up, equipment failure) |  |
| **alert icon** | **Key Point!**  Could be many different implicated foods such as contaminated leafy greens or raw animal product. Encourage investigators to not have tunnel vision.  The list above is not exhuastive of all possible answers. Some participants may have additional observations, record reviews, and interview questions. |  |
| **conversation bubbles icon** | **Question/Answer**  *Invite groups to share the outcomes of their respective group’s findings regarding Observations, Record Review, and Interview.* |  |
|  | **vILT** | * Unmute participants for this Question/Answer period. * Monitor the chat area. |

### Investigative Process Overview

|  |  |  |
| --- | --- | --- |
| slide icon  Slide 19 |  |  |
| speaker icon | Back to our example, let’s continue with looking at the how and why of contributing factors and environmental antecedents. |  |
| slide icon  Slide 20 |  |  |
| speaker icon | So, contributing factors are the how did this happen part of the outbreak. They are the preventable causes.  Contributing factors are split into 3 categories:   * Contamination: ways the pathogen entered the food item * Proliferation: ways the pathogen was allowed to grow in the food * Survival: ways the pathogen survived the kill step.   Here are some examples of contributing factors in each category. These all come from a list produced by the CDC.  **REMIND** participants that they should have the list in their materials as well.  C9 is contamination from infectious food worker/handler through bare hand contact with food.   * An example of this is an infectious food worker/handler preparing deli meat without wearing gloves contaminated the food with pathogen served to restaurant patrons.   P7 is improper cooling of food.   * An example of this is when foods were refrigerated in large masses or as large volumes of foods in containers, which did not allow proper cooling (or chilling the food in an adequate time to control growth of pathogenic bacteria).   S2 is inadequate time and temperature during reheating of food.   * An example of this is reheating of sauces or roasts to a temperature insufficient to reduce the level of contamination to below an infectious dose of pathogen. |  |
| slide icon  Slide 21 |  |  |
| speaker icon | You have the contributing factor list on your tables and will use it during the activity.  They can also be found on the CDC website and there is a QR code to the link on the back of your workbook. | Consider dropping the CDC website link or the QR code into the chat area. |
| slide icon  Slide 22 |  |  |
| speaker icon | Next up are the environmental antecedents, or root causes. These are the underlying issues that allowed a contributing factor to happen. Each contributing factor will have at least one environmental antecedent preceding it. They fall into 5 categories: people, processes, equipment, food, and economics. One tool to identify the environmental antecedents is to use the 5 whys- asking why 5 times until you get to the root cause of the issue. Sometimes this will include more whys, but most of the time you can get to the root cause by asking 5 whys. |  |
| slide icon  Slide 23 |  |  |
| speaker icon | You have the environmental antecedent field guide on your tables and will use it during the activity. The image on the screen is only one page of the document. You can see that many clues lie in the observation and staff interviews where we used the 5 whys. |  |
| **alert icon** | **Key Point!**  The environmental antecedent resource can be found in smaller and larger sizes (smaller size is an infographic and larger size is a training resource) on the CDC website. This medium-sized document (a guide) that we’ll use for the activity can also be found on the QR code on the back of your workbook. |  |

### Tabletop Exercise 2

|  |  |  |
| --- | --- | --- |
| slide icon  Slide 24 |  |  |
| speaker icon | Let’s go back to the workbook and we’ll start exercise 2, which has a part A and B. |  |
| **notes pages icon** | Instructor Note  This exercise is divided into A and B because attendees will need some information from the contributing factors (2A) to identify the environmental antecedents (2B). |  |
| reading eyeglass icon | A Closer Look   * Locate the Environmental Findings on page 5 of your Workbook. |  |
| pencil icon | Participant Guide Work   * Page 6 of your Workbook contains questions for you to answer. Be sure to use your Workbook to take notes. |  |
| slide icon  Slide 25 |  |  |
| speaker icon | When we break, you’ll review the environmental findings on **page 5**  You’ll then think about some follow-up questions you would ask the manager and/or food worker  Then, you’ll answer the questions on **page 6** about follow-up questions and potential categories for contributing factors and environmental antecedents. You won’t identify them yet, but just determine which categories may be applicable to the outbreak. |  |
| **alert icon** | **Key Point!**  Participants will need to first give thought about possible follow-up questions to ask the manager/food worker BEFORE beginning to answer the questions on page 6 of their Workbook. |  |
| slide icon  Slide 26 |  |  |
| speaker icon | Please work with your group for about 10 minutes then we’ll discuss it as a group. The questions you need to answer on page 6 will also be on the screen. |  |
|  | **vILT** | Place participants into groups to answer 2A:  Ensure workbook questions appear for each group.  Trainer(s) / Tech Moderator should:   * Unmute groups so they can discuss * Bounce between breakout rooms. * Cover any housekeeping or instructions for breakout rooms. * Announce a two-minute warning. * End breakout session.   At the end of the breakout session:   * Return participants to the main room. * Pass the lead back to the Trainer. |
| slide icon  Slide 27 |  |  |
| speaker icon | Let’s review the environmental findings:  Environmental Findings:  During the environmental assessment, inspectors observed that   * Meat prep and vegetable prep were done in separate areas. However, employees reported that they used the same grinder for raw beef, raw lamb, and the garbanzo beans used to make falafel. * They reported that the grinder parts were cleaned in the 3-compartment sink, and then washed and sanitized again in the dishwashing machine. * Upon observation of the grinder cleaning process, all food-contact parts of the grinder were removable. * The cleaning process appeared to be effective, as there was no visible evidence of food residue in or on any of the grinder parts.   Inspectors also observed falafel preparation and cooking. The finished cooking temperature was measured at 198°F and was still rising due to heat gain. However, employees didn’t routinely take temperature of the falafels when cooked. | Continue monitoring the chat area for potential questions or technical issues. |
| slide icon  Slide 28 |  |  |
| speaker icon | What are some follow-up questions your groups discussed? | Monitor the chat area for possible comments or questions. |
| **conversation bubbles icon** | *Note to presenter: guide the discussion based on the answers and encourage additional questions to get to an antecedent.*  Follow-up questions in answer key:   * Why are separate grinders not used for the raw meat and garbanzo beans? * How often are all the grinder parts cleaned and sanitized? * Are gloves worn when working with the raw meat? * Can you walk through the food flow of the raw meat and falafel dishes? * What is your employee illness policy? * Do workers eat restaurant food while at work? * Is there a shared employee meal? |  |
| slide icon  Slide 29 |  |  |
| **notes pages icon** | Instructor Note  Review follow-up questions and possible responses. |  |
| slide icon  Slide 30 |  |  |
| **alert icon** | **Key Point!**  Be prepared to raise the question about how often all the grinder parts are cleaned and sanitized if it is not brought up during group discussion. |  |
| speaker icon | Let’s focus on one of the questions: ***How often are all the grinder parts cleaned and sanitized?*** |  |
| **conversation bubbles icon** | **Question/Answer**  *Invite groups to share the outcomes of their respective group’s discussion. This includes which contributing factor and environmental antecedent categories may be applicable in this outbreak.*  **Note:** The groups will not identify the contributing factors and environmental antecedents yet. That is the next exercise. | Allow time for posts in the chat area. |
|  | **vILT** | * Unmute participants for this Question/Answer period. * Monitor the chat area. |
| slide icon  Slide 31 |  |  |
| speaker icon | Let’s move on to part B of exercise 2  You’ll answer the questions on page 7 about contributing factors and environmental antecedents.  Remember, if there are not enough handouts of the contributing factors list and environmental antecedent resource, there are QR codes on the back of your workbook that will pull up the resources. |  |
| slide icon  Slide 32 |  |  |
| speaker icon | Please work with your group for about 10 minutes then we’ll discuss it as a group. |  |
| pencil icon | **Participant Guide Work**  The questions you need to answer on page 7 will also be on the screen. |  |
| **conversation bubbles icon** | **DEBRIEF**  After participants have completed page 7 of their Participant Guide Workbook, and BEFORE proceeding to the next slide:   * Invite participants to share their responses. * Facilitate a large-group discussion for responses where there appears to not be agreement. * Make note of points of agreement and disagreement so contributors feel heard.   For items where disagreement remains – acknowledge that many times this can happen and offer insight on how consensus could be reached or supported by the group. |  |
|  | **vILT**  **NOTE:**  After participants are returned to the main room, and BEFORE proceeding to the next slide –   * Invite groups to share their findings. * Facilitate a large-group discussion for findings where there appears to not be agreement. * Make note of points of agreement and disagreement so contributors feel heard. * For findings where disagreement remains – acknowledge that many times this can happen and offer insight on how consensus could be reached or supported by the group. | Place participants into groups to answer 2B:  Ensure workbook questions appear for each group.  Trainer(s) / Tech Moderator should:   * Unmute groups so they can discuss * Bounce between breakout rooms. * Cover any housekeeping or instructions for breakout rooms. * Announce a two-minute warning. * End breakout session.   At the end of the breakout session:   * Return participants to the main room. * Pass the lead back to the Trainer. |
| slide icon  Slide 33 |  |  |
| speaker icon | **Contributing Factors:**  C8: Cross-contamination of foods   * Pathogen transferred to the vehicle by contact with contaminated worker hands, equipment, or utensils or by drippage or spillage. If worker hands were the mode of contamination, the worker was not infected with or a carrier of the pathogen.   During the exposure, cross-contamination likely occurred between grinder (used to prepare raw meat) and falafel  S1: Inadequate time and temperature control during initial cooking/thermal processing of food   * Time/temperature exposure during initial heat processing or cooking inadequate to kill the pathogen under investigation.   During the exposure, the falafel was likely contaminated with pathogens from raw meat and the falafel was not likely cooked to a high enough temperature to kill pathogens. |  |
| **alert icon** | **Key Point!**  Note: Contributing factors identify how the outbreak occurred and are not a way to list all the violations the establishment may have at the time of the investigation. |  |
| speaker icon | **Environmental Antecedents:**  Lack of training of employees on specific processes   * Employees weren’t taking final cook temperatures of falafel and were using the same grinder for falafel mix and raw meat. This was a new restaurant; employees were likely untrained and unfamiliar with the prep of menu items. Employees did not understand the safe food safety practices to prevent contamination and survival of pathogens.   Lack of oversight of employees   * Management did not have oversight on the falafel preparation process. Management was likely more focused on the business practices of opening a new restaurant and not as focused on oversight of employees and food safety practices.   Insufficient process to mitigate the hazard   * Falafel needing to be cooked to higher temperatures due to shared blender, process was insufficient to eliminate *E. coli*.   You could also choose other antecedents. These decisions are based on the investigator’s determination.  Lack of needed supplies for operating the restaurant  Two grinders (one from raw meat and one for ready-to-eat foods) could have been used to prevent cross-contamination. |  |

### Investigative Process Overview

|  |  |  |
| --- | --- | --- |
| slide icon  Slide 34 |  |  |
| speaker icon | We’ve identified the how and why and now need to focus on preventing future outbreaks |  |
| slide icon  Slide 35 |  |  |
| speaker icon | We know why it happened; now how do we prevent it from happening again? This list has a few examples of things to consider. Some are short term; some are long term. Some are enacted by the facility itself and others by the health department. |  |

### Tabletop Exercise 3

|  |  |  |
| --- | --- | --- |
| slide icon  Slide 36 |  |  |
| speaker icon | Let’s go back to the workbook and we’ll start exercise 3 where we will identify some control measures for the establishment |  |
| slide icon  Slide 37 |  |  |
| speaker icon | You’ll use the control measures lists to think about short- and long-term corrective actions.  Then, you’ll answer the questions on page 8 about what information you still need to collect.  Please work with your group for about **5 minutes** then we’ll discuss it as a group. The questions you need to answer on **page 9** will also be on the screen. |  |
| pencil icon | **Participant Guide Work**  The questions you need to answer on **page 8** will also be on the screen. |  |
|  | **vILT** | Place participants into groups to answer Exercise 3 questions:  Ensure workbook questions appear for each group.  Trainer(s) / Tech Moderator should:   * Unmute groups so they can discuss * Bounce between breakout rooms. * Cover any housekeeping or instructions for breakout rooms. * Announce a two-minute warning. * End breakout session. |
| slide icon  Slide 38 |  |  |
| speaker icon | Please work with your group for about 10 minutes then we’ll discuss it as a group. |  |
| **conversation bubbles icon** | **Debriefing**  Before showing the Exercise 3 Answer Key:   * Invite groups to briefly share their results with the entire class. * Facilitate a brief discussion after all groups have shared.   Be prepared to provide clarity if necessary. | At the end of the breakout session:   * Return participants to the main room. * Pass the lead back to the Trainer. |
| slide icon  Slide 39 |  |  |
| speaker icon | Review the Short-Term and Long-Term summary items.  Short-term:   * Purchase a second grinder for use and label each grinder with its assigned use (raw meat or falafel). An alternative could be to use a different piece of equipment for the falafel if possible, such as a food blender. This can be considered if there is not a budget for another grinder. * Change process to cook falafel to temperature to control bacterial hazards * Train staff to clean and sanitize equipment * Employee illness screenings before work shifts * On-the-job training, focusing on main risks in the establishment   Long-term:   * Provide written policies for cleaning and sanitizing equipment, including when switching between raw and ready-to-eat products * Conduct new employee orientation, which covers illness policy and other food safety policies/practices * Create recipes for falafel, which includes specifics on which grinder to use   *This list is not exhaustive, some participants may have additional items to add.* |  |
| slide icon  Slide 40 |  |  |
| speaker icon | Community Level:   * Findings from outbreaks can reduce future foodborne illness outbreaks by providing corrective actions to outbreak establishments * Your investigations can help influence policy. For example, New York City used findings from their environmental assessments to support a policy for mandatory paid sick leave in all establishments within their jurisdiction.   National Level:   * Data from environmental assessments were used to inform CIFOR’s outbreak response guidelines and the revision of Epi-Ready, a foodborne illness response training. * This data can also provide evidence for policies, such as support for new food code provisions. They can also inform practice at food establishments. We have a great example on the next slide. |  |
| **conversation bubbles icon** | **Debriefing**  Before showing the Exercise 3 Answer Key:   * Invite groups to briefly share their results with the entire class. * Facilitate a brief discussion after all groups have shared. * Be prepared to provide clarity if necessary. |  |
| slide icon  Slide 41 |  |  |
| speaker icon | The Water Quality and Health Council created these cleaning and sanitizing infographics for retail food establishments as an infographic, or quick guide. These resources were created because cleaning and sanitizing was a large gap in food safety, and this was discovered through outbreak data. Resources like these hopefully reduce the occurrence of outbreaks due to cross-contamination.  Website: https://waterandhealth.org/resources/posters/#food-safety | * Drop the website link into Chat.   <https://waterandhealth.org/resources/posters/#food-safety> |

### Take Home Points

|  |  |  |
| --- | --- | --- |
| slide icon  Slide 42 |  |  |
| speaker icon | We have a few take home points to summarize what we reviewed today. |  |
| slide icon  Slide 43 |  |  |
| **alert icon** | **Key Point!**  First, environmental antecedents are key to identifying root causes. Understanding root causes can help inform the outbreak establishment of corrective actions to avoid a similar outbreak again. |  |
| slide icon  Slide 44 |  |  |
| **alert icon** | **Key Point!**  Second, there are many resources available to help identify contributing factors and environmental antecedents and assist with training. CDC recently released two resources that are available on their website:   1. A contributing factor video on the importance of identifying practices and factors that contribute to an outbreak. This 9-minute training video explains contributing factors and how they are identified in an outbreak. 2. Environmental antecedent resources to assist in identifying the antecedents of an outbreak. As we mentioned earlier, these will come in three sizes, depending on your need. The small one is a quick one-pager that you see on the right side of the screen. The medium size is what you used for the exercise today – this serves as a field guide. The large document is 13 pages and goes into detail on each of the antecedents. |  |
| document icon | **Resources**:  From Inspector to Investigator Video:  https://www.youtube.com/watch?v=pWEywTiX3Sw  Antecedent Resource on right:  https://www.cdc.gov/nceh/ehs/nears/docs/field-guide-to-identifying-root-causes-508.pdf  Root causes homepage: https://www.cdc.gov/nceh/ehs/nears/root-causes-of-outbreaks.html | * Drop the Resources links into Chat. |
| slide icon  Slide 45 |  |  |
| speaker icon | **Key Point!**  Lastly, report your outbreak data to CDC’s National Environmental Assessment Reporting System, also known as NEARS, to contribute to the advancement of outbreak science. NEARS captures environmental assessment data from foodborne illness outbreak investigations.  For more information on the program, please reach out to nears@cdc.gov. More information can be found on the NEARS Webpage QR code on the back of your workbooks.  **Resources:**  NEARS webpage: National Environmental Assessment Reporting System (NEARS) Home | EHS | CDC |  |
| slide icon  Slide 46 |  | * Ensure the QR codes are visible to participants. |
| speaker icon | Thank you for participating in the *E. coli* portion of the Understanding the Root Case of an Outbreak training. |  |
| document icon | **Resources**:  Refer to the QR codes for:   * NEARS Webpage * Contributing Factor Video * Environmental Antecedent Resources |  |

1. Terminology

The following is a list of terms or acronyms with their respective definitions.

|  |  |
| --- | --- |
| Term | Definition |
| IAFP | International Association for Food Protection |
| CDC | Centers for Disease Control and Prevention |
| CIFOR | Council to Improve Foodborne Outbreak Response |
| EHS-Net | Environmental Health Specialists Network |
| NEARS | National Environmental Assessment Reporting System. An online tool from the CDC used by jurisdictions across the United States to track environmental assessments that are conducted as a result of foodborne illness investigations. |
| STEC | Shiga toxin-producing Escherichia coli. The term used to refer to a group of *E. coli* bacteria that produce powerful toxins, which can cause severe illness. |
| Word | Description |
| Word | Description |
| Word | Description |
| Word | Description |
| Word | Description |
| Word | Description |
| Word | Description |
| Word | Description |
| Word | Description |
| Word | Description |
| Word | Description |
| Word | Description |
| Word | Description |

1. Resources

The following is a list of resources used throughout this training.

|  |  |  |
| --- | --- | --- |
| Resource | Description/Link | |
| IAFP and CIFOR | | |
| IAFP Keys | https://www.foodprotection.org/upl/downloads/publications/other/free-procedures-keys.pdf | |
| CIFOR Guidelines for Foodborne Disease Outbreak Response | https://cifor.us/downloads/clearinghouse/CIFOR-Guidelines-Complete-third-Ed.-FINAL.pdf | |
| CIFOR Outbreaks of Undetermined Etiology Agent List | http://cifor.us/uploads/resources/CIFOR-OUE-Agent-List\_FINAL.pdf | |
| **Contributing Factors and Environmental Antecedents** | | |
| Contributing Factor Definitions | https://www.cdc.gov/restaurant-food-safety/php/investigations/cf-definitions.html | |
| Environmental Antecedent Webpage with Resource | https://www.cdc.gov/restaurant-food-safety/php/investigations/root-causes.html | |
| **Additional Resources** | | |
| NEARS Web Page | | https://www.cdc.gov/restaurant-food-safety/php/investigations/nears.html |
|  | |  |
|  | |  |
| Contributing Factor Video | | https://www.youtube.com/watch?v=pWEywTiX3Sw |

**Resources (Cont’d).**

|  |  |
| --- | --- |
| Water Quality and Health Council | https://waterandhealth.org/resources/posters/#food-safety |
|  |  |

1. Level 2 Evaluation Questions

On a scale of 1 to 5, how would you rate your confidence level for each of the following statements? (*1 – Very poor to 5 – Excellent*)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Before Training:  *When faced with an outbreak, I felt confident in:* | | | | |  | After Training  *When faced with an outbreak, I will feel confident in:* | | | | |
| 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
|  |  |  |  |  | 1. Identifying resources to aid in an outbreak investigation. |  |  |  |  |  |
|  |  |  |  |  | 1. Using evidence from an environmental assessment to identify contributing factor(s). |  |  |  |  |  |
|  |  |  |  |  | 1. Asking the “5 whys” to understand why contributing factors occurred. |  |  |  |  |  |
|  |  |  |  |  | 1. Identifying appropriate environmental antecedents. |  |  |  |  |  |
|  |  |  |  |  | 1. Describing best control measures to prevent future outbreaks. |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |

1. Questions to Facilitate Engagement
2. Under what circumstances would it be appropriate to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_?
3. If there were conflicting information, how would you resolve these differences?
4. What does IAFP say about \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_?
5. If you thought the information was incorrect, how would you address it?
6. What factors add to the complexity of an outbreak?
7. Do you see a pattern?
8. What evidence did you find to support your conclusion(s)?
9. What did you learn during this scenario that you can apply to your next investigation?
10. Sample facilitative question?
11. Sample facilitative question?
12. Sample facilitative question?
13. Sample facilitative question?
14. Sample facilitative question?
15. Sample facilitative question?
16. Sample facilitative question?
17. (SAMPLE) Worksheet for Sandbox Time
18. Scenario 1: Name

*Description of scenario 1.* Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum.

* 1. Question?
  2. Question?
  3. Question?
  4. Question?
  5. Question?
  6. Question?

1. Scenario 2: Name

*Description of scenario 2.* Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum.

* 1. Question?
     1. If no, why?
     2. If yes, why?
  2. Question?
  3. Question?
  4. Question?