

Three Steps and a Hop

A Foodborne Illness Outbreak Investigation

TABLE TOP EXERCISE

Developed by the

**Colorado Integrated Food Safety
Center of Excellence**

INSTRUCTOR



Integrated Food Safety
Centers of Excellence

Learning Objectives

After completing this case study, students should be able to:

- Explain what constitutes a foodborne illness outbreak.
- Describe the steps in a foodborne illness outbreak investigation.
- List different outbreak investigation team members and their roles and responsibilities.
- Establish and apply an outbreak case definition.
- Describe outbreak-associated cases by time, person, and place.
- Create and interpret an epidemic curve.
- Describe the types of epidemiological studies used during an outbreak investigation.
- Calculate and interpret measures of association.
- Describe the purpose of conducting an environmental assessment.
- Define and give examples of contributing factors.
- Explain how to summarize and share outbreak investigation findings.



Specific instructions for the instructor are indicated with this symbol.



Guided answers for the instructor are indicated with this symbol.

This case study was developed by the Colorado Integrated Food Safety Center of Excellence. For additional information or to provide feedback, visit

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PART A: BEGINNING THE INVESTIGATION

Initial Complaint Call

At 12:55pm on Monday, March 14th an epidemiologist from the El Paso County Public Health Communicable Disease Program received a phone call from the president of a Polka Dance Club, Joy Johnson. Joy was calling on behalf of dance club members who reported becoming ill following the annual Hippety-Hop Dance Festival.

- I** (Optional) Instructor, ask students to refer to the timeline at the end of their packet and fill in events as they progress through the case study.

Question 1: What additional information should you request from Joy Johnson? What questions would you ask her?

- Q** You should try to obtain as much information as possible during the initial complaint call in case you are unable to contact the complainant again. Gather as much information as you can about the ill people and the event. You should also obtain contact information for the complainant.

Questions for Joy may include:

Information about the ill people:

- What type of symptoms are people reporting?
- Has anyone visited a health care provider or received a specific diagnosis?
- What were the ages of those affected?
- Where were festival attendees from? Where did they stay?

Information about the event:

- Where was the festival held?
- How many people attended the festival?
- Was food served? Who prepared the food?
- Do you have contact information for the restaurant or catering company?
- Do you have a list of all attendees?

Contact information for the complainant:

- May I contact you again if I have additional questions?
- Can I have your telephone number or email address?

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You ask Joy for more information about the ill people and the event.

Joy said she heard of at least 15 attendees who had become ill. She noted that some people were experiencing diarrhea and stomach pain, but did not get specifics from everyone. She believed that most became ill sometime on the Saturday and Sunday of the Hippety-Hop Dance Festival which was held from Friday, March 11 to Sunday, March 13.

The Hippety-Hop Dance Festival began on Friday evening with polka dancing and a welcome dinner. The dinner was prepared by “Catering by Charlotte” and took place from 4:00-7:00 PM. While over 100 people attended the Hippety-Hop Dance Festival, only about 80 people attended the Friday night events as many were still arriving from out of town.

Joy said she noted the names of some attendees who reported becoming ill. She said she had contact information of all festival attendees and the caterer, Charlotte North of “Catering by Charlotte”.

Question 2: Do you think this represents an outbreak? Why or why not?

Ⓚ The general definition of an outbreak is the occurrence of disease cases in excess of what would normally be expected in a defined community, geographical area, or season. A foodborne illness outbreak is defined as an incident in which two or more persons experience similar illness resulting from ingestion of a common food.

Factors to consider in this outbreak include:

- Over 15 reported cases of illness seems more than would be expected for an event of this size.
- Ill persons are all reporting gastrointestinal symptoms, which suggests they are experiencing a similar illness.
- It appears that people were reporting illness onset over a short period of time, suggesting a single exposure.
- At this point, it is unclear if the outbreak was foodborne but initial information suggests a point source outbreak (potentially from food or exposure at the welcome dinner on Friday evening) because cases were clustered by onset time, symptoms, and exposure.

Question 3: What next steps would you take?



Next steps could include:

- Interviewing some ill people to gain more specific information about their symptoms, onset time, and onset date. This information will help determine if symptoms are really suggestive of a similar illness.
- Collect 3-5 stool samples to submit to the public health laboratory to determine the pathogen causing illness. Knowing the pathogen will help investigators to develop a hypothesis about the cause of the outbreak.
- Notify the state health department so they are aware of the outbreak and can be alerted for any complaints in other jurisdictions.
- Notify the state laboratory that stool samples have been requested and will be submitted for testing.
- Contact members from your outbreak team, or (optional) activate the Incident Command Structure.

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After determining that an outbreak investigation should be conducted, you decided to contact some of the individuals from Joy's list to learn more about their illness and the event, and ask if they would be willing to submit a stool sample for testing. You notified the state health department and the public health lab expects samples. You also called a meeting with individuals on your team to inform them of the upcoming outbreak investigation.

Question 4: Who should be part of the outbreak investigation team? Briefly describe each role.

- Q** Potential members of an outbreak investigation team include:
- Epidemiologist – this position leads the outbreak team, organizes data collection, summarization, and dissemination.
 - Public Health Nurse – this position may conduct interviews and assist with specimen collection.
 - Environmental Health Specialist – this position leads and conducts the environmental assessment and site visit.
 - Public Health Laboratory – tests clinical, food, and environmental samples to identify the causative agent.
 - Communications Officer – point person for communicating with the media or the public.

- I** Additional Discussion Points:
- This would be a good point to discuss the differences between outbreak investigation teams across different public health agencies.
 - It is important to recognize that members of the outbreak investigation team can perform multiple roles if needed

Initial Case Interviews

To generate a hypothesis about the cause of the outbreak, you contact three ill individuals from Joy's list to learn more about their illness and the event.

Question 5: What questions would you ask during these initial case interviews?

Q Given these illnesses are related to a specific event, you would likely conduct unstructured interviews, including some questions about their illness, the event, and potential exposures. It is important to ask about the potential exposures directly and indirectly related to the event. Potential questions are outlined below.

About their illness:

- What symptoms are you experiencing? When did symptoms begin? Symptom and onset date are used to identify the incubation period and hypothesize possible etiologies.
- Did you see a medical provider for this illness? If they sought medical care they may have submitted a stool sample, and you can request the test results from the health care provider. Additionally, knowing if they sought medical care and whether they were hospitalized for their illness can indicate disease severity.
- Have you already provided a stool sample or would you be willing to provide a stool sample? Submitting stool samples to the public health laboratory increases the likelihood of identifying the pathogen.

About the event:

- Did you attend the Friday night event? Did you eat the welcome dinner? This question help establishes if the Friday night dinner might be a common exposure between those who became ill. It can also identify if food was a potential exposure and if the exposure was consistent between ill people.
- What foods/drinks were served at the Friday night dinner? More specifically identifies potential exposures and commonalities between ill people
- Did you participate in any other events or activities related to the Friday night dinner? It is important to identify if there were other potential exposures outside of the Friday night dinner. Although you suspect the dinner, at this stage you would not rule out additional exposures.
- Collect some demographic information (i.e., age, sex). Demographic information is used compare characteristics or identify trends of those who became ill. You can identify if one group is disproportionately being affected more than a different group.
- Address and place staying during the festival. Because most participants traveled from out of state to attend the festival, it is possible they were exposed somewhere other than the festival.
- Do they know of other attendees that were ill? Asking attendees about other that were ill will help with case finding and gives you a better grasp of the scope of the outbreak.
- Confirm contact information for the attendee and let them know that you may be calling back with additional questions.

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By speaking with three ill attendees you were able to gather specific symptom information, including the date and time of illness onset. All three persons reported having diarrhea and two reported experiencing cramping beginning on Saturday morning at 1:00am, 7:00am, and 10:30am, respectively. All three agreed to provide a stool sample for testing.

None of the attendees that you spoke to reported participating in other events besides the Friday welcome dinner. No one knew of anyone with a similar illness who did not attend the event.

You were also able to clarify which foods were served at the Friday welcome dinner (see menu below). You discovered that a variety of desserts were prepared by Polka Dance Club members and sold during the dinner by volunteers. Drinks were provided by the Polka Dance Club at the cash bar, served by Joy and several volunteers.

Friday Dinner Menu

Braised Brisket

*Haluski**

Buttered Peas

Cole Slaw

Homemade Gravy

Mashed Potatoes

Homemade Rolls

I *Haluski is a noodle & cabbage dish

Question 6: Based on the information provided so far, develop a case definition for this outbreak.

Hint: a case definition should include person, place, time, and clinical information.

Q Case definitions establish specific criteria for classifying cases, while also ruling out illnesses not associated with the outbreak. Student case definitions may vary, but all should include information about person, place, time, and clinical information.

Case definition going forward in the exercise:

“A case is defined as a person having diarrhea (defined as three or more loose stools in a 24-hour period) after attending the Friday night welcome dinner at the Hippyty-Hop Dance Festival with onset of illness March 11-13.”

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PART B: EPIDEMIOLOGIC STUDY

A case was defined as a person having diarrhea (at least 3 or more loose stools in a 24-hour period) after attending the Friday night welcome dinner at the Hippety-Hop Dance Festival with onset of illness from March 11-13.

Your team decided to conduct an epidemiologic study to determine which exposure made people ill.

Question 7: What type of epidemiologic study should you conduct to investigate this outbreak? Why?

Hint: The two types of epidemiologic studies most commonly used in outbreak investigations are cohort studies and case-control studies.

- *A cohort study is used when there is a well-defined group of individuals. Cohort studies compare the incidence of disease in exposed persons versus unexposed persons.*
- *A case-control study is more often used when the disease or outcome of interest is rare, or when the group is not well-defined. Case-control studies compare the odds of exposure between the ill (cases) and not ill (controls).*

Ⓚ A key difference between these study designs is that cases and controls are chosen based on their disease status, whereas cohorts are determined by their exposure status.

Given this is a well-defined group with contact information available, a cohort study would be the most appropriate epidemiological study to use in this outbreak. However, if resources were limited and staff only had time to interview a subset of attendees, a case-control study could be conducted.

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Given that this was a well defined group with a manageable number of people, the investigation team decided to conduct a cohort study. The team contacted and interviewed everyone who attended the Friday evening welcome dinner.

You created a hypothesis-testing questionnaire asking about symptoms, what foods and drinks they consumed, and potential secondary cases. Based on responses from the hypothesis-testing interviews, you built a line list of all individuals reporting symptoms (Appendix A).

Question 8: Apply the case definition to the line list of attendees reporting symptoms (Appendix A). How many outbreak-associated cases are there?

Q There are a total of 26 cases that met the outbreak case definition.

To meet the case definition, students should have focused on the “Onset date”, “Diarrhea”, and “Max Stool” columns in the line list. Individuals qualify as a case under the following conditions:

- Onset date is within 3/11/2011-3/13/2011
- Diarrhea is a “Yes” or “Y”
- Max stool is $\geq 3^*$

* Students may notice “lots” in the max stool column. Although the exact number of max stools isn’t identified, we can assume that it is greater than 3 and therefore meets the case definition. Explain to students that this occurrence is common in real outbreak settings where ill individuals may provide ambiguous answers.

ID numbers 1, 14, 15, 21, and 31 do not meet the case definition.

- Although ID #1 has diarrhea with a maximum number of stools >3 , their illness onset date is outside of the 3/11/2011-3/13/2011 range.
- IDs 14, 15, 21, 31 do not meet the case definition because their maximum number of stools is <3 .

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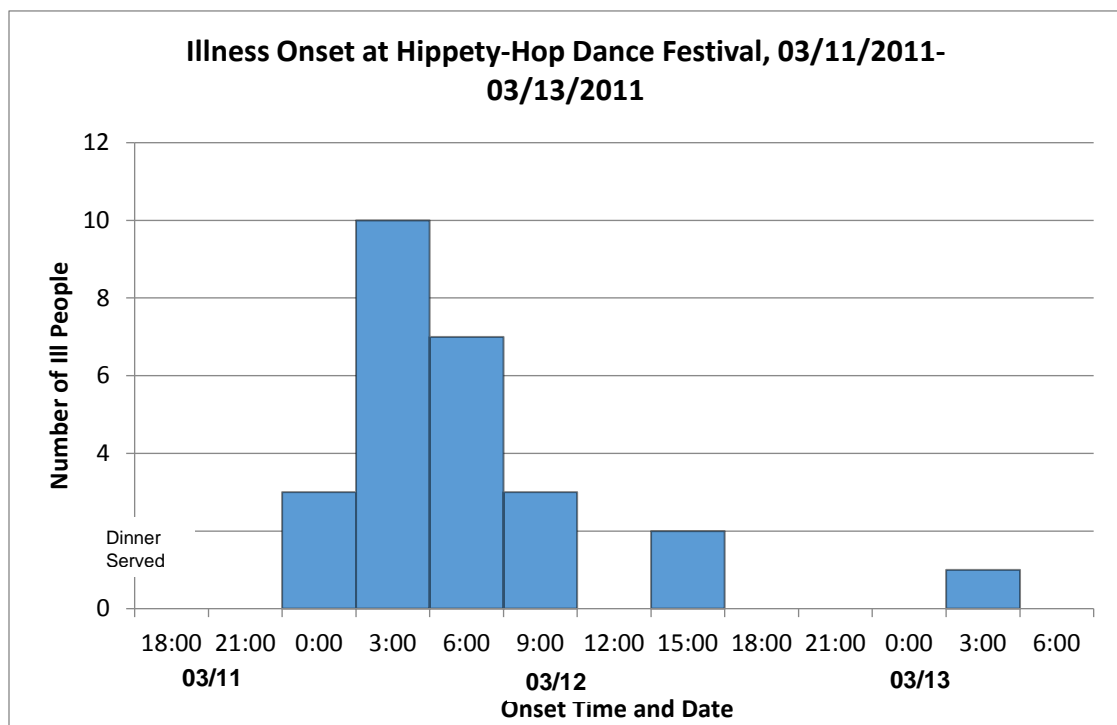
Based on the case definition, you have determined a total of 26 outbreak-related cases. Your next step was to build an epidemic curve to provide a visual representation of the outbreak.

Question 9a: Build the epidemic curve for this outbreak. What pattern does the epidemic curve show? Use graph paper on page 21.

Hints for creating epidemic curves:

- *The epidemic curve is a histogram showing the number of outbreak-associated cases by their time of onset*
- *Should include a brief, but descriptive title (including place, time)*
- *The x/y axes should be clearly labeled*
- *The x axis represents the date or time of illness onset among cases*
 - *The unit of time is usually 1/4 to 1/3 of the median incubation period*
- *The y axis shows the number of ill cases*
- *There should be no gaps between the bars of the histogram*

Q



Q

This epidemic curve is consistent with a point source outbreak. A point source outbreak is characterized by persons who are exposed to the same source over a brief period of time, which can include a single meal or event. The epidemic curve shows a rapid peak in cases then a gradual fall. In a point source outbreak, the majority of cases fall within one incubation period. The majority of cases had an incubation time ranging between 7-22 hours, with a median incubation period of 12 hours.

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Question 9b: Given that the Friday night dinner took place at 6 PM on Friday, March 11, what is the median incubation period for this illness?

Hint: You can use the line list or epidemic curve to calculate median incubation period.

- I** If students are struggling to calculate the median incubation period, please guide them through the following steps:
- On the line list (Appendix A), cross off any person that was previously identified as non-cases (IDs: 1, 14, 15, 21, 31)
 - Make an additional column labeled as “incubation” or “incubation period”
 - To calculate the incubation period, subtract the onset time from the time of exposure (6 PM)
 - When calculating the incubation period, make sure students check onset date as illness onset included both 3/12 and 3/13
 - Since there are an even number of values, take the mean of the two middle incubation periods to yield the median
- Q** The median is defined as the midpoint value in a dataset. Based on the 6 PM exposure time on 3/11/2011, the median incubation period is 12 hours.

Question 10: Use the information collected thus far and the symptoms and onset table (Appendix B) to determine a suspect etiology. Justify your answer.

- Q** The primary lower gastrointestinal symptoms (diarrhea, cramps) with a short incubation period (7-22 hour range, median onset of 12 hours), closely match the symptomatology of bacterial toxins. The state laboratory should test for bacterial toxins such as *Clostridium perfringens* and *Bacillus cereus*.

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You notify the state laboratory of the suspected exposure to bacterial toxins including *Clostridium perfringens* and *Bacillus cereus*. Similar to your investigation findings, bacterial toxins cause lower gastrointestinal symptoms such as diarrhea and cramps, and have a shorter onset time that match the incubation period.

The illness incubation period and epidemic curve pattern further supported your hypothesis that food from the Friday welcome dinner was the point source cause of the outbreak. Based on the interviews with persons who attended the Friday night dinner, you collected their exposure information and performed statistical analysis.

Question 11: Use the information below to construct 2x2 tables for exposure to the Friday night dinner and foods including brisket, gravy, mashed potatoes, coleslaw.

- A total of 76 people attended the Friday evening dinner (26 ill and 50 non-ill)
- 26 ill and 33 non-ill people ate the dinner
- 24 ill and 36 non-ill people ate brisket
- 25 ill and 28 non-ill people ate gravy
- 26 ill and 26 non-ill people ate mashed potatoes
- 20 ill and 30 non-ill people ate coleslaw

I Students should work individually or in pairs to complete the 2x2 table for the Friday night dinner and one or more of the foods.

Q

Dinner	Ill	Not Ill
Ate	26	33
Did Not Eat	0	17

Brisket	Ill	Not Ill
Ate	24	36
Did Not Eat	2	14

Gravy	Ill	Not Ill
Ate	25	28
Did Not Eat	1	22

Mashed Potatoes	Ill	Not Ill
Ate	26	26
Did Not Eat	0	24

Coleslaw	Ill	Not Ill
Ate	20	30
Did Not Eat	6	20

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Question 12a: What is the appropriate measure of association for this study design?

Hint: Risk Ratios (also called Relative Risks) are the measure of association for cohort studies and Odds Ratios are the measure of association for case-control studies.

- Q Calculating a risk ratio is the most appropriate measure of association for this cohort study. The risk ratio compares the incidence of disease in the exposed to the incidence of disease in the unexposed.

Question 12b: Use the 2x2 tables to calculate the appropriate measure of association for the dinner and each food. Interpret the risk ratios associated with eating the brisket, gravy, and coleslaw.

Hint: Here are the formulas to calculate Risk Ratios and Odds Ratios:

Risk Ratio = (Incidence of Exposed) / (Incidence of Unexposed)

$$RR = [a / (a+b)] / [c / (c+d)]$$

$$\text{Odds Ratio} = \frac{[(\text{Exposed III})/(\text{Unexposed III})]}{[(\text{Exposed Not III})/(\text{Unexposed Not III})]}$$

$$OR = \frac{a/c}{b/d} = \frac{a*d}{b*c}$$

	Ill	Not Ill
Exposed	a	b
Unexposed	c	d

Another Hint: Epi Info 7 can do this math for you and has a free app.

- I Have students calculate the risk ratios individually or in pairs and share their interpretations with the table.

*p-values are optional because they require the use of a statistical program to calculate.

In order to calculate a relative risk estimate for foods that have zeroes in cells, it is possible to plug in a small number such as 1, which will provide an estimate that is not undefined.

- Q Dinner: $(26/59) / (0/17) = \text{undefined}$ (p-value* = 0.002)
Brisket: $(24/60) / (2/16) = 3.2$ (p-value = 0.07)
Gravy: $(25/53) / (1/23) = 10.8$ (p-value=0.0008)
Mashed potatoes: $(26/52) / (0/24) = \text{undefined}$ (p-value <0.0001)
Coleslaw: $(20/50) / (6/26) = 1.7$ (p-value =0.07)

Risk Ratio Interpretations

- Persons who ate brisket were 3.2 times more likely to become ill than persons who did not eat brisket.
- Persons who ate gravy were 10.8 times more likely to become ill than persons who did not eat gravy.
- Persons who ate coleslaw were 1.7 times more likely to become ill than persons who did not eat coleslaw.

Question 12c: Based on the risk ratios, are any foods implicated by the cohort study? If yes, which one(s)?

Q Mashed potatoes and gravy are both implicated in this cohort study due to the high relative risk (RR) associated with them. The risk of illness was over 10 times as high for those who ate mashed potatoes and gravy compared to those who did not eat them.

Due to zeroes in cells, the RR for dinner and mashed potatoes are undefined. However, the mashed potatoes are implicated because their p-value is statistically significant ($p < 0.0001$) which supports an association between consuming the mashed potatoes and developing illness.

I Additional discussion point:

- Certain foods such as mashed potatoes and gravy can yield similar relative risk estimates because they are often eaten together.
- Further investigation is needed to determine if the high relative risk is due to the food itself or an artifact of being paired with another implicated food item.
- For now, you would implicate both foods due to their high relative risk.

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PART C: THE ENVIRONMENTAL ASSESSMENT

The results of your statistical analysis indicated that mashed potatoes (RR=undefined) and gravy (RR=10.1) are all implicated in the outbreak.

In addition to the epidemiologic investigation, the environmental health team conducted an environmental assessment. An environmental assessment is defined as a systematic, detailed, science-based evaluation of environmental factors that contributed to the transmission of disease in an outbreak. In this outbreak investigation, the environmental health investigators planned to conduct an environmental assessment at the Catering by Charlotte facility. They evaluated a variety of policies, processes, and critical violations to help explain how food contamination, pathogen survival, or pathogen proliferation caused disease transmission.

Question 13: What activities would the environmental health staff perform during an environmental assessment?

Q Conduct a site visit of Catering by Charlotte's facility. A site visit can include the following activities outlined below:

- Conduct a facility walk through to provide an overall idea of the facility layout, equipment, and structure
- Interview the manager because they can provide insight into the facility's policies, schedules, preparation/handling practice, and notable events around the time of the outbreak
- Interview the food handlers to gain more information about specific practices such food preparation, storage, glove use, etc. You can also learn if any food handlers were ill around the time of the outbreak.
- Observe and note the facility's operations to confirm or refute information gained during the interviews and identify critical violations that would have contributed to disease transmission.
- Collect environmental, food, and sometimes clinical samples for testing at the public health laboratory.
- Collect records – such as food invoices, temperature logs, food worker illness logs, and equipment repair logs, to identify issues at the facility that could have contributed to disease transmission

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At 3:00pm on Wednesday, March 16, the environmental health investigator visited Charlotte at her place of work to conduct an interview. While investigating Catering by Charlotte, they discovered she did not have a Retail Food Establishment (RFE) license on file. The environmental health team was unable to perform an investigation of the catering kitchen because Charlotte did not have an RFE and prepared all food at her private residence. However, the team was able to conduct an investigation of the Polka Dance Club kitchen because food was stored, reheated, and served from the facility. Details of the interview and investigation are provided in the Environmental Health Investigation Report (Appendix C).

Question 14: What are some of the contributing factors that may have increased the risk of foodborne illness from the Friday dinner food or drink? Use the Environmental Health Investigation Report (Appendix C)

Hint: Contributing factors are categorized as contamination, proliferation, and survival.



Contamination

- An ill food handler or drink server could contaminate the food or drink; however, none were reported

Proliferation and Survival

- Given the unknown size of containers and temperature of the caterer's refrigerator where the prepared food was stored, improper cooling and refrigeration could have allowed bacteria to multiply or produce toxins at an infectious dose level.
- Inadequate reheating (should be 165°F) or improper hot-holding (should be 135°F) could also be contributing factors as some bacterial or toxin contaminants could survive and proliferate. Charlotte reported issues with the buffet's hot-holding temperatures, and claims to have reheated food to 160-180°F. No temperature logs were kept.

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On March 17th, the public health laboratory contacted you with the stool specimen test results. All three specimens were positive for *Clostridium perfringens*.

Question 15: Relate the environmental assessment findings to your suspicions about the cause of the outbreak. Use the IAFP Keys to support your case (Appendix D)

Q Based on the laboratory results, students should focus on contributing factors relevant to *Clostridium perfringens*. The contributing factors relevant to the Friday night dinner could include:

- Improper hot-holding
- Inadequate refrigeration
- Room temperature holding
- Improper cooling
- Inadequate reheating

These contributing factors are not only relevant to the transmission of *C. perfringens* but also relevant to the implicated foods. Mashed potatoes and gravy were high risk foods in this outbreak because they were prepared at Charlotte's private kitchen, cooled, stored, transported to the Polka Dance Club kitchen, reheated, and served. Any of the factors listed above could have contributed to the proliferation and transmission of *C. perfringens* in the mashed potatoes and gravy.

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PART D: CONCLUDING THE INVESTIGATION

After conducting the environmental assessment, confirming the pathogen, and identifying the contributing factors, you ordered a cease and desist on Catering by Charlotte until she obtains the proper licensing. Your final steps in concluding the investigation were to write the outbreak report and communicate your findings to the outbreak stakeholders.

Question 16: To whom should you communicate your findings?



The following people should be informed about the investigation findings:

- Joy Johnson, President of the Polka Dance Club
 - Can notify the festival attendees and work to prevent foodborne illness at their future events.
- Charlotte North, owner of “Catering by Charlotte”
 - Can take steps to fix the food handling and preparation process, as well as obtain the proper catering licensure.
- State health department—submit final outbreak report
 - The state health department monitors and manages outbreak surveillance in the state and its surrounding counties.
- CDC—complete a NORS report
 - Through the National Outbreak Reporting System, the CDC can perform outbreak surveillance at the national level and track trends across the states.
- Each person who provided a stool sample—should receive their results confidentially
 - Knowing their results, the ill people can seek additional medical care to resolve their illness and symptoms, if needed

Question 17: What communication and collaboration between outbreak team members practiced during this table top exercise will you apply to your agency’s next outbreak?

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You wrap up the outbreak by communicating your findings in an outbreak report for the state health department and a NORS report for the Centers for Disease Control and Prevention. The environmental health program issued a cease and desist order to Catering by Charlotte until she obtains the proper license. You also presented your findings to Joy, President of the Polka Dance Club. Joy asked many questions regarding best practices of finding and hiring a licensed caterer, which you answer in hopes of helping to prevent any future illnesses at the Hoppety-Hop Festival. Joy invites your investigation team to attend the Hoppety-Hop Festival next year.

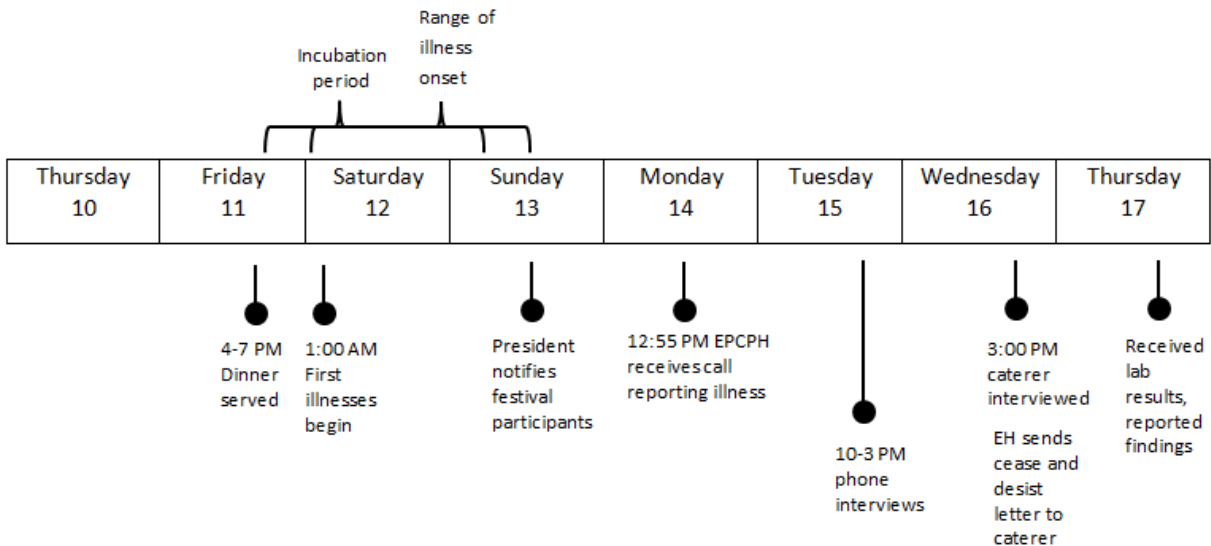
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As you go through the outbreak investigation, use the timeline to track important developments in the investigation.

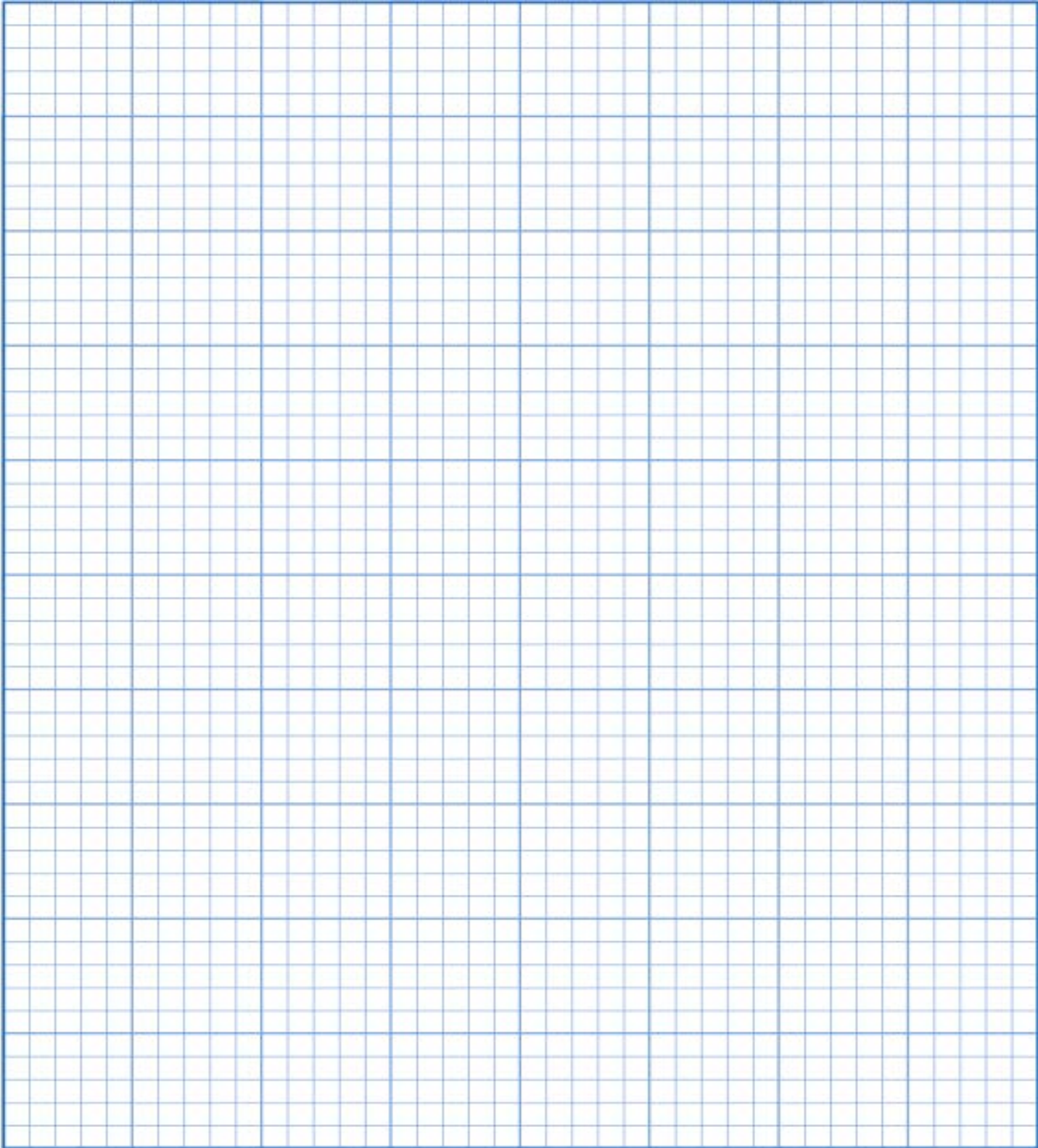
March

Thursday 10	Friday 11	Saturday 12	Sunday 13	Monday 14	Tuesday 15	Wednesday 16	Thursday 17

Q *Instructor Note: Below is the completed timeline. Students should be able to compare their timeline events to the ones below.*



Graph Paper



AUTHORS

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This case study was developed by the Colorado Integrated Food Safety Center of Excellence in collaboration with the original investigators. Some aspects of the outbreak investigation have been altered for the purposes of this case study. Additionally, the methods utilized in this case study reflect the approach used for this particular outbreak. Outbreak response procedures, policies, and methods may vary by country, state, or local jurisdiction.

The Colorado Integrated Food Safety Center of Excellence (CoE) is a collaborative partnership between the Colorado Department of Public Health and Environment (CDPHE) and the Colorado School of Public Health (CSPH), one of six Integrated Food Safety Centers of Excellence designated by the Centers for Disease Control and Prevention (CDC). We are dedicated to identifying and developing model practices in foodborne disease surveillance and outbreak response. We provide trainings, continuing education opportunities, and serve as a resource for local, state, and federal public health professionals who respond to foodborne illness outbreaks. Learn more at www.COFoodSafety.org.