



# Science Ambassador 2016 Lesson Plan

## Don't Let *Salmonella* Ruffle Your Feathers Multistate Outbreak of *Salmonella* in the United States

### Overview

This lesson plan uses information from an epidemiologic outbreak to teach concepts concerning zoonotic disease. Students gain skills in epidemiologic thinking, identifying cause and effect associations related to health and disease, data analysis, and how to use data to justify decision making. Students develop a working definition for zoonotic disease. Then, students evaluate a case study on the basis of real events in a 2014 outbreak of human *Salmonella* infections linked to live poultry in the United States. They use data to create a geographic spot map to identify epidemiologic patterns, identify strategies to collect data using questionnaires, and design prevention materials using CDC's One Health methodologies as a guide. This case study is intended for middle school students in grades 6–12.

### Learning Objectives

After completing this lesson, students should be able to

- construct a definition of a zoonotic disease;
- use epidemiology to determine the source of the outbreak;
- create a spot map to identify patterns that characterize an outbreak by geographic location; and
- develop prevention strategies on the basis of the One Health approach.

### Duration

This lesson plan can be taught as one 90-minute session or divided into two, 45-minute sessions.



## Authors

Teachers who attended CDC’s Science Ambassador Workshop developed this lesson plan. The Science Ambassador Workshop is an annual career workforce training for science, math, and health science teachers. For more information, see: <http://www.cdc.gov/careerpaths/scienceambassador>.

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## Acknowledgements

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## Suggested Citation

Centers for Disease Control and Prevention (CDC). Science Ambassador Workshop—Don’t Let *Salmonella* Ruffle Your Feathers: Multistate Outbreak of *Salmonella* in the United States. Atlanta, GA: U.S. Department of Health and Human Services, CDC; 2016. Available at: <http://www.cdc.gov/scienceambassador/lesson-plans/>.

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# Don't Let *Salmonella* Ruffle Your Feathers

## Multistate Outbreak of *Salmonella* in the United States

### Background

Animals provide many benefits to people. However, some animals might carry diseases that can be shared with people. Zoonotic diseases or zoonoses are diseases caused by harmful germs (pathogens) that can be spread between animals and people. Many germs have been responsible for illnesses and outbreaks among people, including *Salmonella*, *E. coli* O157:H7, and *Cryptosporidium*. These germs can come from many types of animals, including pets, wild animals, and farm animals.<sup>1</sup>

In early 2014, epidemiologists identified five clusters of human *Salmonella* infections using PulseNet. PulseNet is an online surveillance system that compares the DNA fingerprints of bacteria from people around the United States to find clusters of disease that might represent unrecognized outbreaks. Many ill persons in each of the five clusters reported contact with live poultry, primarily chicks and ducklings. Since the poultry was from the same mail-order hatchery, the epidemiologists decided to merge the clusters into a single investigation. During February 3–October 14, 2014, a total of 363 persons infected with outbreak strains of *Salmonella* serotypes Infantis, Newport, and Hadar were reported from 43 states and Puerto Rico, making it the largest live poultry-associated salmonellosis outbreak reported in the United States.<sup>2,3</sup>

### Summary

Students analyze a real outbreak to determine the origin and transmission of *Salmonella* by completing a spot map and interpreting the data.<sup>2</sup> In addition, students consider the questions asked by a public health official when determining the cause of an outbreak, relate the cause to a specific zoonotic disease, and identify prevention measures by using the methodology exemplified by One Health, which recognizes that the health of people is connected to the health of animals and the environment. One Health is the collaborative effort of multiple disciplines (human health care providers (e.g. physicians, nurses), veterinarians, ecologists, and many others) working together to achieve optimal health for people, animals, and our environment.<sup>4</sup>

This case study is intended for students in grades 6–12 and can be included as a part of lessons concerning public health and epidemiology. It is recommended that students have a basic understanding of bacteria before approaching these activities.



Figure 1. This poster demonstrates sanitary practices when handling live chickens in response to an increase in *Salmonella* outbreaks since the 1990s. Source: [http://www.cdc.gov/features/salmonellababybirds/salmonellababybirds\\_c250px.gif](http://www.cdc.gov/features/salmonellababybirds/salmonellababybirds_c250px.gif)

<sup>1</sup> More information about Zoonotic Diseases can be found at: <http://www.cdc.gov/zoonotic/gi/index.html>.

<sup>2</sup> More information on this outbreak can be found at: <http://www.cdc.gov/salmonella/live-poultry-05-14/index.html>.

<sup>3</sup> CDC. Notes from the Field: Multistate Outbreak of Human *Salmonella* Infections Linked to Live Poultry from a Mail-Order Hatchery in Ohio - February-October 2014, Morbidity and Mortality Weekly Report (MMWR), available at: <https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6409a5.htm>.

<sup>4</sup> More information about One Health can be found at [www.cdc.gov/onehealth](http://www.cdc.gov/onehealth).



## Part 1: *Salmonella* Scare (45 minutes)

### Preparation

Before Part 1,

- Make copies of Worksheet 1A: *Salmonella* Case Study, one copy per student
- Review Worksheet 1B: *Salmonella* Case Study, Guide
- Review online resources and background material, as needed, including CDC's Principles of Epidemiology in Public Health Practice, Lesson 6, Section 2: Steps of an Outbreak Investigation. See *Online Resources*.

### Materials

- Worksheet 1A: *Salmonella* Case Study  
Description: This case study focuses on the 2014 multistate *Salmonella* outbreak. It engages students in the process of recognizing patterns and drawing conclusions from a set of data. The Guide (Worksheet 1B) offers background information, additional resources, and optional instruction strategies.

### Online Resources

- CDC's *Salmonella* Homepage  
<https://www.cdc.gov/salmonella/index.html>  
Description: This resource provides basic information about *Salmonella* and infections, and may be helpful to review with the class prior to the lesson plan.
- CDC's Timeline for Reporting Cases of *Salmonella* Infection  
<http://www.cdc.gov/salmonella/reporting-timeline.html>  
Description: Review this resource before starting Part 1. It states how *Salmonella* cases are reported, methods for determining type of infection, and provides a visual.
- CDC's *Salmonella* Index  
<http://www.cdc.gov/salmonella/index.html>  
Description: This resource summarizes the history of *Salmonella* and can be referenced for additional information regarding transmission.
- CDC's One Health Homepage  
[www.cdc.gov/OneHealth](http://www.cdc.gov/OneHealth)  
Description: This resource provides an overview of the One Health approach.
- CDC's Reports of Selected *Salmonella* Outbreak Investigations  
<http://www.cdc.gov/salmonella/outbreaks.html>  
Description: This resource provides information about *Salmonella* outbreaks during the last 10 years and can be used as an additional resource after Part 1 has been completed by the students.
- CDC's Multistate Outbreak of Human *Salmonella* Infections Linked to Live Poultry in Backyard Flocks  
<http://www.cdc.gov/salmonella/live-poultry-05-14/index.html>  
Description: This resource contains information about the 2014 *Salmonella* outbreak discussed in this study.
- CDC's Principles of Epidemiology in Public Health Practice, Lesson 1, Section 6: Descriptive Epidemiology  
<http://www.cdc.gov/ophss/csels/dsepd/ss1978/lesson1/section6.html>  
Description: Use this resource for background information on descriptive epidemiology, including how to create spot maps.

### Online Resources (Continued)

- CDC's Principles of Epidemiology in Public Health Practice, Lesson 6, Section 2: Steps of an Outbreak Investigation  
<http://www.cdc.gov/ophss/csels/dsepd/SS1978/Lesson6/Section2.html>  
Description: This resource provides information about the steps involved in investigating an outbreak and should be reviewed before Part 1.

### Activity

1. Distribute Worksheet 1A: *Salmonella* Case Study. Read the partial case overview and student learning objective aloud. Ask students what they know about *Salmonella* and *Salmonella* infections. Facilitate a class discussion covering type of pathogen (bacteria), incubation period (12–72 hours), symptoms of infection (diarrhea, fever, and abdominal cramps), duration of illness (4–7 days), and possible sources (contaminated food and water or contact with animals). Alternatively, assign students to research information about *Salmonella* by using the CDC website on *Salmonella*, available at <http://www.cdc.gov/salmonella/>. At the end of the discussion, ask students to complete Question 1 on their worksheets.
3. Read *Salmonella* Scare and review Table 1 as a class. Have students create a spot map to determine which states were the most affected by the *Salmonella* outbreak. The number of cases per state will determine how the spot map should be colored. Have students write the number of cases in each state on the respective colored state on the map. For more information on how to create a spot map, see *Online Resources*.
4. Assign students to complete Questions 3–6 in groups. They will need their completed spot maps to answer the questions.

## Part 2: Zoonotic Disease Definition and Prevention (45 minutes)

### Preparation

Before Part 2,

- Make copies of Worksheet 2A and Figures 1–4, one copy per student
- Review Worksheet 2B, Guide

### Materials

- Worksheet 2A: Defining Zoonotic Diseases and Using One Health  
Description: This worksheet guides students through defining the term *zoonotic disease*, as well as creating and evaluating preventions using One Health methodologies. The Guide (Worksheet 2B) offers background information, additional resources, and optional instruction strategies.
- Figure 1: Questionnaire Poultry Exposure  
Description: This questionnaire is used by CDC to identify the origin and causes of a *Salmonella* outbreak related to poultry exposure.
- Figure 2: Stay Healthy when Working with Farm Animals  
Description: This poster identifies ways of preventing exposure to zoonotic diseases from farm animals. The poster is available at <http://www.cdc.gov/healthypets/resources/stay-healthy-working-farm-animals.pdf>.
- Figure 3: After you touch ducklings or chicks, wash your hands so you don't get sick!  
Description: This poster identifies ways to prevent the spread of zoonotic diseases from poultry. The poster is available at <http://www.cdc.gov/healthypets/resources/salmonella-baby-poultry.pdf>.
- Figure 4: Have a backyard flock? Don't wing it!  
Description: This poster identifies the proper way to safely incorporate poultry into a backyard. This poster can also be found online at: <http://www.cdc.gov/healthypets/resources/backyard-flock-8x11.pdf>

### Online Resources

- CDC's PulseNet  
<https://www.cdc.gov/pulsenet/about/index.html>  
Description: This resource provides information on PulseNet, a national laboratory network that connects foodborne illness cases to detect outbreaks.
- *MMWR*'s Notes from the Field: Multistate Outbreak of Human *Salmonella* Infections Linked to Live Poultry from a Mail-Order Hatchery in Ohio — February–October 2014  
<http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6409a5.htm>  
Description: This link provides information reported in the Case Overview of Part 2 with additional references.
- CDC's Principles of Epidemiology in Public Health Practice, Lesson 1, Section 10 Chain of Infection  
<http://www.cdc.gov/ophss/csels/dsepd/ss1978/lesson1/section10.html>  
Description: This website has additional information on the chain of infection with helpful visual representations.
- CDC's Spring and Baby Poultry are Here!  
<http://www.cdc.gov/Features/SalmonellaBabyBirds/index.html>  
Description: Review this page before Part 2 to enhance understanding about the relationship between *Salmonella* and handling live poultry.

### Online Resources (Continued)

- CDC's One Health  
<https://www.cdc.gov/onehealth/>  
Description: These web pages provide information on the One Health approach, and should be reviewed before starting Part 2.
- CDC's Healthy Pets Healthy People  
<https://www.cdc.gov/healthypets/>  
Description: This is a site that describes how to stay healthy while enjoying your pets.

### Activity

1. Hand out Worksheet 2A and Figure 1. Have the students evaluate their responses from Question 6 on Part 1: *Salmonella* Scare.
2. Have students read through the Case Overview either individually or as a class.
3. Guide the students through the remainder of the worksheet. On Question 4, regarding One Health methodologies, create the same 3 columns on a whiteboard. After students organize their own answers on the worksheet, each student should be in charge of categorizing one item on the board by writing it down or using adhesive notecards.
4. Conclude the activity by projecting Figures 2, 3, and 4, and have the students evaluate their effectiveness both on the worksheet and in a class discussion.

## Extension 1: Using Data as Evidence (45 minutes)

### Preparation

Before the Extension Activity,

- Make copies of Extension Worksheet 1: Illness Onset Dates, one per group of 4 students

### Materials

- Extension Worksheet 1: Illness Onset Dates  
Description: The worksheet provides a line list of data for this investigation. Students will use this data to create graphic displays of the outbreak, including epidemic curves and spot maps.

### Online Resources

- CDC's Quick-Learn Lesson: Create an Epi Curve  
<http://www.cdc.gov/training/quicklearns/createepi/>  
Description: Use this resource as an introduction to epi curves before starting the extension activity.
- CDC's *Salmonella* Outbreak Investigations: Timeline for Reporting Cases  
<http://www.cdc.gov/salmonella/reportingtimeline.html>  
Description: Give this link to students to help them determine the time of exposure as they complete visual representations of the data.

### Activity

1. Arrange the students into groups of 4, and provide each group with a copy of Extension Worksheet 1: Illness Onset Dates. Inform the students that these are the dates patients became sick with *Salmonella*.
2. Encourage students to organize the information into a graph. Depending on your level of students, you can provide them with options, such as a scatter plot or epidemic curve.
3. Have the students present their data and use it as evidence with spot maps from Part 1: *Salmonella* Scare to create an argument concerning when and in which state the outbreak began.



## Extension 2: Testing Samples (45 minutes)

### Preparation

Before the Extension Activity,

- Make copies of the Eppendorf Tube Labels and Testing Samples Worksheet for each pair of students.
- For each pair, prepare 15 Eppendorf tubes,
  - label Eppendorf tubes using Extension Worksheet 2A: Eppendorf Tube Labels;
  - prepare negative (-) culture samples by adding 1ml of distilled water to Eppendorf tubes 003, 004, 008, and 011; and
  - prepare positive (+) culture samples: prepare a solution of 20 ml of distilled water and 1–2 ml of phenolphthalein (mixed well), and add 1 ml of the mixture to the Eppendorf tubes: 001, 002, 005, 006, 007, 009, 010, 012, 013, 014, and 015.
- For each pair, prepare 15 sample agar testing tubes,
  - prepare clear gelatine, according to package directions, and allow it to cool to room temperature;
  - add of 1–2 tsp. of sodium carbonate and 2 drops of yellow food coloring to 2 ml of distilled water. Pour this mixture into the room temperature gelatine; and
  - pour 2 ml of gelatine mixture into each of the 15 Eppendorf tubes, and cover them with clear plastic wrapping. Set in a slant to refrigerate until the experiment.

### Materials

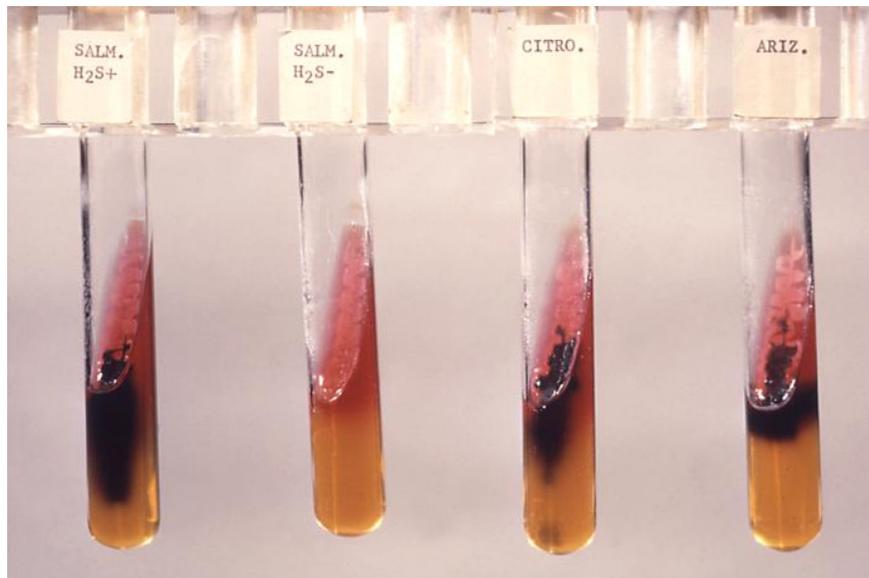
- Extension Worksheet 2A: Eppendorf Tube Labels  
Description: This worksheet provides culture sample labels for a class of 30 students. The sample dates and locations correspond to Extension Worksheet 1: Illness Onset Dates.
- Extension Worksheet 2B: Testing Samples  
Description: This worksheet provides directions for testing each of the laboratory samples listed on Extension Worksheet 2A.
- For each pair of students,
  - Masking tape and marker for labeling
  - 15 Eppendorf tubes
  - 1–2 ml of phenolphthalein
  - A cup and spoon for mixing
  - 15 test tubes
  - Test tube rack
  - 1 packet of clear gelatin
  - 1 tsp. sodium carbonate
  - Yellow food coloring
  - Clear plastic wrapping film
  - Personal protective equipment: gloves, goggles, apron

## Online Resources

- Final case count map from CDC's Multistate Outbreak of Human *Salmonella* Infections Linked to Live Poultry from a Mail-Order Hatchery in Ohio — February–October 2014  
<http://www.cdc.gov/salmonella/live-poultry-05-14/map.html>  
Description: This link provides information about the different affected states to label the samples.
- Final Epi Curve from CDC's Multistate Outbreak of Human *Salmonella* Infections Linked to Live Poultry in Backyard Flocks  
<http://www.cdc.gov/salmonella/live-poultry-05-14/epi.html>  
Description: This links show the final epi curve of the outbreak to label samples
- CDC's Salmonella: Diagnosis and Treatment  
<http://www.cdc.gov/salmonella/general/diagnosis.html>  
Description: This link explains how an infection with *Salmonella* can be identified with lab testing.

## Activity

1. Pair students and provide each pair with a copy of Extension Worksheet 2A: Eppendorf Tube Labels and Extension Worksheet 2B: Testing Samples.
2. Explain the purpose and procedures of tests.
3. Have students test the samples by following Extension Worksheet 2B. Note that a positive result is indicated by the agar turning a reddish color. (See image below.) Testing modeled on an acid-based reaction between sodium carbonate and phenolphthalein.
4. Create a table with the test results of all samples and discuss.
5. Have students discuss the data and answer the questions on the worksheet.



Source: Centers for Disease Control: Public Health Image Library (PHIL) ID # 5158.  
<https://phil.cdc.gov/phil/home.asp>

## Educational Standards

In this lesson, the following CDC Epidemiology and Public Health Science (EPHS) Core Competencies for High School Students,<sup>1</sup> Next Generation Science Standards\* (NGSS) Science & Engineering Practices,<sup>2</sup> and NGSS Cross-cutting Concepts<sup>3</sup> are addressed:

**HS-EPHS1-1.** Describe how epidemiologic thinking is used to provide an evidence-based explanation concerning causes and correlations of health and disease.

### NGSS Key Science & Engineering Practice<sup>2</sup>

#### Constructing Explanations and Designing Solutions

Apply scientific ideas, principles, or evidence to provide an explanation of phenomena and solve design problems, taking into account possible unanticipated effects.

### NGSS Key Crosscutting Concept<sup>2</sup>

#### Cause and Effect

Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects.

**HS-EPHS1-3.** Apply epidemiologic thinking and a public health approach to a model (e.g., outbreak) to explain cause and effect associations that influence health and disease.

### NGSS Key Science & Engineering Practice<sup>2</sup>

#### Developing and Using Models

Develop, revise, or use a model that is based on evidence to illustrate or predict relationships between systems or between components of a system.

### NGSS Key Crosscutting Concept<sup>2</sup>

#### Cause and Effect

Cause and effect relationships can be suggested and predicted for complex natural and human designed systems by examining what is known about smaller scale mechanisms within the system.

**HS-EPHS2-4.** Use patterns in empirical evidence to formulate hypotheses.

### NGSS Key Science & Engineering Practice<sup>2</sup>

#### Planning & Carrying out Investigations

Make directional hypotheses that specify what happens to a dependent variable when an independent variable is manipulated.

*Secondary Science & Engineering Practice: Asking Questions & Defining Problems*

### NGSS Key Crosscutting Concept<sup>2</sup>

#### Patterns

Empirical evidence is needed to identify patterns.

<sup>1</sup> Centers for Disease Control and Prevention (CDC). Science Ambassador Workshop—Epidemiology and Public Health Science: Core Competencies for high school students. Atlanta, GA: US Department of Health and Human Services, CDC; 2015.

<sup>2</sup> NGSS Lead States. Next Generation Science Standards: For States, By States (Appendix F—Science and Engineering Practices, Appendix G—Crosscutting Concepts). Achieve, Inc. on behalf of the twenty-six states and partners that collaborated on the NGSS. 2013. Available at: <http://www.nextgenscience.org/get-to-know>.

\* Next Generation Science Standards is a registered trademark of Achieve. Neither Achieve nor the lead states and partners that developed the Next Generation Science Standards was involved in the production of, and does not endorse, this product.

**HS-EPHS4-3.** Evaluate competing health-related intervention strategies by using a systematic assessment to improve effectiveness.

**NGSS Key Science & Engineering Practice<sup>2</sup>**

**Engaging in Argument from Evidence**

Evaluate competing design solutions to a real-world problem based on scientific ideas and principles, empirical evidence, or logical arguments regarding relevant factors (e.g. economic, societal, ethical considerations).

**NGSS Key Crosscutting Concept<sup>2</sup>**

**Patterns**

Patterns of performance of designed systems can be analyzed and interpreted to reengineer and improve the system.

*Secondary Crosscutting Concept: Structure and Function*

**Appendices**



## Worksheet 1A

# Part 1: Don't Let *Salmonella* Ruffle Your Feathers 2014 Multistate Outbreak of *Salmonella*, Guide

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Directions:** Read through the case study, and complete the corresponding activities.

### Partial Case Overview

In early 2014, epidemiologists identified five clusters of human *Salmonella* infections using PulseNet. PulseNet is an online surveillance system that compares the DNA fingerprints of bacteria from people around the United States to find clusters of disease that might represent unrecognized outbreaks.

Many ill persons in each of the five clusters reported contact with live poultry, primarily chicks and ducklings. Since the poultry was from the same mail-order hatchery, the epidemiologists decided to merge the clusters into a single investigation.

During February 3–October 14, 2014, a total of 363 persons infected with outbreak strains of *Salmonella* serotypes Infantis, Newport, and Hadar were reported from 43 states and Puerto Rico, making it the largest live poultry-associated salmonellosis outbreak reported in the United States.<sup>1,2</sup>

At the end of this case study, students will be able to

- construct a definition of a zoonotic disease;
- use epidemiology to hypothesize the origin of the outbreak;
- create a spot map to identify patterns that characterize an outbreak by geographic location; and
- develop prevention strategies based on the One Health approach.

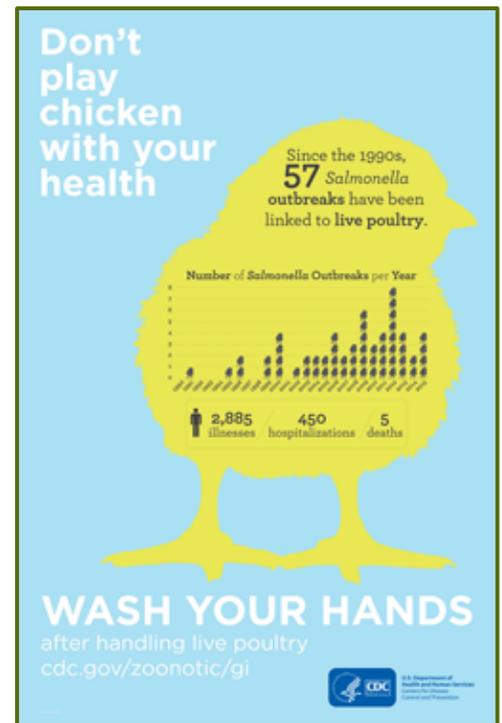


Figure 1. This poster demonstrates sanitary practices when handling live chickens in response to an increase in *Salmonella* outbreaks since the 1990s.

Source:  
[http://www.cdc.gov/features/salmonellababybirds/salmonellababybirds\\_c250px.gif](http://www.cdc.gov/features/salmonellababybirds/salmonellababybirds_c250px.gif)

<sup>1</sup> More information on this outbreak can be found at: <http://www.cdc.gov/salmonella/live-poultry-05-14/index.html>.

<sup>2</sup> CDC. Notes from the Field: Multistate Outbreak of Human *Salmonella* Infections Linked to Live Poultry from a Mail-Order Hatchery in Ohio - February-October 2014, Morbidity and Mortality Weekly Report (MMWR), available at: <https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6409a5.htm>.

## Salmonella Brainstorm

Use the space below to take notes on *Salmonella*. Your notes should include

- type of pathogen
- incubation period
- symptoms of infection
- duration of illness
- possible sources

Notes:

**Question 1:** What are the symptoms of a *Salmonella* infection?

## Salmonella Score

During February 3–October 14, 2014, a total of 363 persons infected with outbreak strains of *Salmonella* Infantis, *Salmonella* Newport, or *Salmonella* Hadar were reported from 43 states and Puerto Rico. No deaths were reported, but 33% of infected persons were hospitalized. Number of cases by state are provided in Table 1.

Table 1. *Salmonella* Infantis, *Salmonella* Newport, or *Salmonella* Hadar cases (N = 363) reported by state — 43 states, February 3–October 14, 2014

State	Number of Cases	State	Number of Cases
Alabama	9	Montana	3
Arizona	3	Nebraska	5
Arkansas	3	New Hampshire	3
California	5	New Jersey	3
Colorado	5	New Mexico	2
Connecticut	2	New York	36
Florida	1	North Carolina	34
Georgia	17	Ohio	31
Idaho	5	Oregon	2
Illinois	6	Pennsylvania	33
Iowa	5	Puerto Rico	1
Indiana	4	South Carolina	9
Kansas	2	South Dakota	6
Kentucky	15	Tennessee	20
Louisiana	1	Texas	4
Maine	9	Utah	2
Maryland	3	Vermont	7
Massachusetts	2	Virginia	25
Michigan	2	Washington	10
Minnesota	3	West Virginia	18
Mississippi	2	Wisconsin	2
Missouri	2	Wyoming	1

Source: <http://www.cdc.gov/salmonella/live-poultry-05-14/map.html>

**Question 2:** Which states were the most affected by the *Salmonella* outbreak?

Before answering Question 2, use the data in Table 1 to create a spot map of the outbreak. If there are no cases, do not color the state. If there are 1–9 cases, color with color A. If there are 10–19 cases, color with color B. For  $\geq 20$  cases, color with color C. You may choose any three colors to represent Color A, B, and C. Do not forget to make a legend key with your map. For example, Color A is Blue.



**Question 3:** Observe the distribution of cases on the spot map you created. What patterns do you see?

**Question 4:** Interpret the patterns. Why would there be a cluster of cases in a specific geographic region on this spot map? How would you explain a single state with a high number of cases far away from this geographic region?

**Question 5:** If you were an epidemiologist in charge of this investigation, how would you determine if these cases are connected in some way? Hint: Who do you need to talk to, and how would you communicate with them?

**Question 6:** What kinds of questions could you ask those affected by the outbreak to establish a connection between the cases? Create a questionnaire that could be used to perform an epidemiological study. Your questionnaire should have at least 15–20 questions.

## Worksheet 1B

# Part 1: Don't Let *Salmonella* Ruffle Your Feathers

## 2014 Multistate Outbreak of *Salmonella*, Guide

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Directions:** Read through the case study, and complete the corresponding activities.

### Partial Case Overview

In early 2014, epidemiologists identified five clusters of human *Salmonella* infections using PulseNet. PulseNet is an online surveillance system that compares the DNA fingerprints of bacteria from people around the United States to find clusters of disease that might represent unrecognized outbreaks.

Many ill persons in each of the five clusters reported contact with live poultry, primarily chicks and ducklings. Since the poultry was from the same mail-order hatchery, the epidemiologists decided to merge the clusters into a single investigation.

During February 3–October 14, 2014, a total of 363 persons infected with outbreak strains of *Salmonella* serotypes Infantis, Newport, and Hadar were reported from 43 states and Puerto Rico, making it the largest live poultry-associated salmonellosis outbreak reported in the United States.<sup>1,2</sup>

At the end of this case study, students will be able to

- construct a definition of a zoonotic disease;
- use epidemiology to hypothesize the origin of the outbreak;
- create a spot map to identify patterns that characterize an outbreak by geographic location; and
- develop prevention strategies based on the One Health approach.



Figure 1. This poster demonstrates sanitary practices when handling live chickens in response to an increase in *Salmonella* outbreaks since the 1990s.

Source:  
[http://www.cdc.gov/features/salmonellababybirds/salmonellababybirds\\_c250px.gif](http://www.cdc.gov/features/salmonellababybirds/salmonellababybirds_c250px.gif)

<sup>1</sup> More information on this outbreak can be found at: <http://www.cdc.gov/salmonella/live-poultry-05-14/index.html>.

<sup>2</sup> CDC. Notes from the Field: Multistate Outbreak of Human *Salmonella* Infections Linked to Live Poultry from a Mail-Order Hatchery in Ohio - February-October 2014, Morbidity and Mortality Weekly Report (MMWR), available at: <https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6409a5.htm>.

## Salmonella Brainstorm

Use the space below to take notes on *Salmonella*. Your notes should include

- type of pathogen (**Answer:** bacteria),
- incubation period (**Answer:** 12–72 hours),
- symptoms of infection (**Answer:** diarrhea, fever, and abdominal cramps),
- duration of illness (**Answer:** 4 to 7 days), and
- possible sources (**Answer:** contaminated food and water; contact with animals).

**Note:** Students might need to research this information in small groups by using technology or brainstorming as a class. In a class discussion, it might be helpful to list different symptoms on a whiteboard, then narrow the possibilities as research progresses.

Notes:

**Question 1:** What are the symptoms of a *Salmonella* infection?

**Answer:** The majority of persons infected with *Salmonella* develop diarrhea, fever, and abdominal cramps from 12 to 72 hours after infection. The illness usually lasts 4–7 days, and the majority of persons recover without treatment. In some cases, diarrhea can be so severe that the patient needs to be hospitalized. In these patients, the *Salmonella* infection might spread from the intestines to the blood stream, and then to other body sites. In these cases, *Salmonella* can cause death unless the person is treated promptly with antibiotics. Older persons, infants, and those with impaired immune systems are more likely to have a severe illness.<sup>9</sup>

<sup>9</sup> More information about Salmonella can be found at: <http://www.cdc.gov/salmonella/index.html>.

## Salmonella Score

During February 3–October 14, 2014, a total of 363 persons infected with outbreak strains of *Salmonella* Infantis, *Salmonella* Newport, or *Salmonella* Hadar were reported from 43 states and Puerto Rico. No deaths were reported, but 33% of infected persons were hospitalized. Number of cases by state are provided in Table 1.

Table 1. *Salmonella* Infantis, *Salmonella* Newport, or *Salmonella* Hadar cases (N = 363) reported by state — 43 states, February 3–October 14, 2014

State	Number of Cases	State	Number of Cases
Alabama	9	Montana	3
Arizona	3	Nebraska	5
Arkansas	3	New Hampshire	3
California	5	New Jersey	3
Colorado	5	New Mexico	2
Connecticut	2	New York	36
Florida	1	North Carolina	34
Georgia	17	Ohio	31
Idaho	5	Oregon	2
Illinois	6	Pennsylvania	33
Iowa	5	Puerto Rico	1
Indiana	4	South Carolina	9
Kansas	2	South Dakota	6
Kentucky	15	Tennessee	20
Louisiana	1	Texas	4
Maine	9	Utah	2
Maryland	3	Vermont	7
Massachusetts	2	Virginia	25
Michigan	2	Washington	10
Minnesota	3	West Virginia	18
Mississippi	2	Wisconsin	2
Missouri	2	Wyoming	1

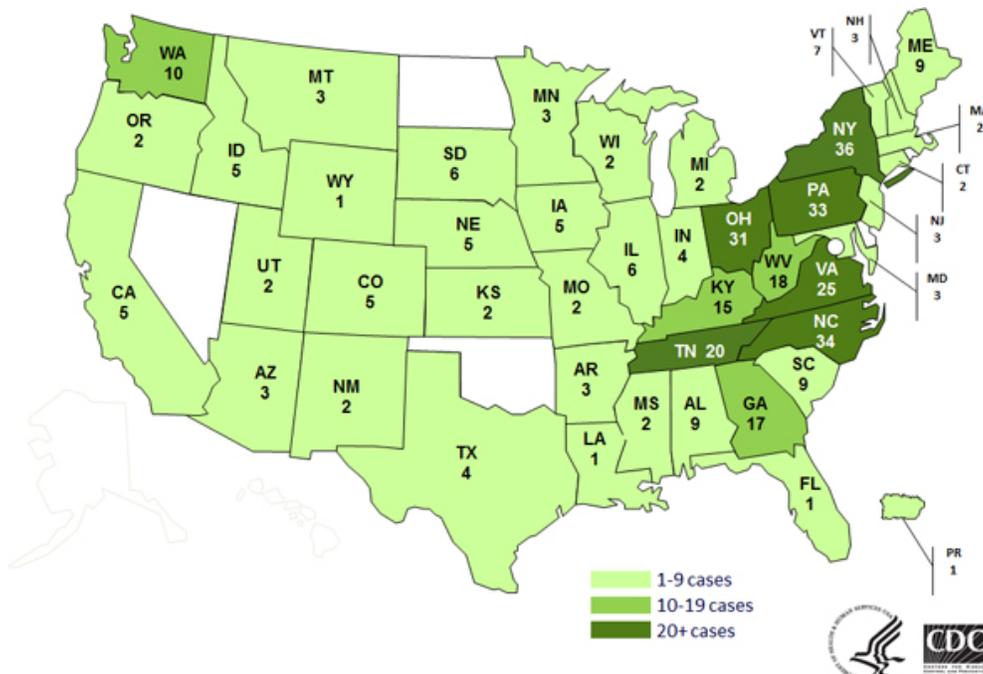
Source: <http://www.cdc.gov/salmonella/live-poultry-05-14/map.html>

**Question 2:** Which states were the most affected by the *Salmonella* outbreak?

Before answering Question 2, use the data in Table 1 to create a spot map of the outbreak. If there are no cases, do not color the state. If there are 1–9 cases, color with color A. If there are 10–19 cases, color with color B. For  $\geq 20$  cases, color with color C. You may choose any three colors to represent Color A, B, and C. Do not forget to make a legend key with your map. For example, Color A is Blue.



**Answer:** The states that were the most affected (i.e., those with 20 or more cases) were New York (36), North Carolina (34), Pennsylvania (33), Ohio (31), Virginia (25), and Tennessee (20).



Source: Centers for Disease Control and Prevention: <http://www.cdc.gov/salmonella/live-poultry-05-14/map.html>

**Question 3:** Observe the distribution of cases on the spot map you created. What patterns do you see?

**Note:** Assessment of an outbreak by place not only provides information on the geographic extent of a problem, but can also demonstrate clusters or patterns that provide important etiologic clues. A spot map is a simple and useful technique for illustrating where patients live, work, or might have been exposed. For more information, see <http://www.cdc.gov/ophss/csels/dsepd/SS1978/Lesson6/Section2.html>.

**Answer:** A high number of cases were reported in the mideastern part of the United States with an especially high number of cases reported in New York, Pennsylvania, Ohio, Virginia, Tennessee, and North Carolina. All of these states are relatively close geographically. Students might also note that Washington has a high number of cases, and it is farther away from these states.

**Question 4:** Interpret the patterns. Why would there be a cluster of cases in a specific geographic region on this spot map? How would you explain a single state with a high number of cases far away from this geographic region?

**Note:** Allow students to speculate and discuss this in small groups and then share with class. List speculations on the board, creating an opening for short group discussion.

**Answer:** Answers will vary. *Salmonella* can be transmitted to people multiple ways and students can give answers attributable to transmission types. Students might present scenarios of food delivery, animal delivery, or contaminated water systems that connect the outbreak in the states.

Some examples of answers include the following:

- Persons in these states were exposed to contaminated food or water.
- Persons in these states had direct contact with infected animals or animals' environment

Source: Centers for Disease Control and Prevention:  
<http://www.cdc.gov/salmonella/general/technical.html>

**Question 5:** If you were an epidemiologist in charge of this investigation, how would you determine if these cases are connected in some way? Hint: Who do you need to talk to, and how would you communicate with them?

**Answer:** If epidemiologists suspect a connection between the patients (because they have the same strain of *Salmonella*), public health workers would design a survey asking questions of persons who are ill to help determine if there are similarities among them and try to collect this information for as many persons as possible. In some cases, public health officials might alert the public through local or national media in an attempt to learn more about suspected cases.

- For more information, see [www.cdc.gov/ophss/csels/dsepd/SS1978/Lesson6/Section2.html](http://www.cdc.gov/ophss/csels/dsepd/SS1978/Lesson6/Section2.html).
- For more information on foodborne disease outbreak investigation and surveillance, see [www.cdc.gov/foodsafety/outbreaks/surveillance-reporting/investigation-toolkit.html](http://www.cdc.gov/foodsafety/outbreaks/surveillance-reporting/investigation-toolkit.html).
- For a sample of a hypothesis generating questionnaire, see [http://www.cifor.us/clearinghouse/uploads/NationalHoQues\\_Fillable\\_OMB0920-0997.pdf?CFID=21919678&#38;CFTOKEN=16531536&#38;jsessionid=0E4990498FC752278DC283B8D8C39AC7.cfusion](http://www.cifor.us/clearinghouse/uploads/NationalHoQues_Fillable_OMB0920-0997.pdf?CFID=21919678&#38;CFTOKEN=16531536&#38;jsessionid=0E4990498FC752278DC283B8D8C39AC7.cfusion).

**Question 6:** What kinds of questions could you ask those affected by the outbreak to establish a connection between the cases? Create a questionnaire that could be used to perform an epidemiological study. Your questionnaire should have at least 15–20 questions.

**Note:** Provide students with categories in which to base their questions, depending on their grade level and experience. Category examples include personal identifying information, clinical information (e.g., symptoms and onset), and risk factor information (i.e., possible sources of infection, including questions related to eating potentially contaminated food, potentially contaminated water, or contact with animals or animal environments). See the answer below for more information.

**Answer:** In some investigations, investigators develop a data collection form tailored to the specific details of that outbreak. In others, investigators use a generic case report form. Regardless of which form is used, the data collection form should include the following types of information about each case.

- Identifying information. A name, address, and telephone number is essential if investigators need to contact patients for additional questions and to notify them of laboratory results and the outcome of the investigation. Names also help in checking for duplicate records, while the addresses allow for mapping the geographic extent of the problem.
- Demographic information. Age, sex, race, and occupation. Provide the characteristics of descriptive epidemiology needed to characterize populations at risk.
- Clinical information. Signs and symptoms allow investigators to verify that the case definition has been met. Date of onset is needed to chart the time course of the outbreak. Supplementary clinical information, such as duration of illness and whether hospitalization or death occurred, helps characterize the spectrum of illness.
- Risk factor information. This information must be tailored to the specific disease in question. For example, since food and water are common vehicles for hepatitis A but not hepatitis B, exposure to food and water sources must be ascertained in an outbreak of the former but not the latter.
- Reporter information. The case report must include the reporter or source of the report, usually a physician, clinic, hospital, or laboratory. Investigators will sometimes need to contact the reporter, either to seek additional clinical information or report back the results of the investigation.

Traditionally, the information described above is collected on a standard case report form, questionnaire, or data abstraction form.

**Addendum:** See Appendix: Figure 1 for CDC questionnaire used in a typical outbreak.

<http://www.cdc.gov/ophss/csels/dsepd/SS1978/Lesson6/Section2.html>

## Worksheet 2A

# Part 2: Don't Let *Salmonella* Ruffle Your Feathers

## 2014 Multistate Outbreak of *Salmonella*, Guide

Name: \_\_\_\_\_

Date: \_\_\_\_\_

### Directions:

### Comparing Questionnaires

Obtain Worksheet 1A: *Salmonella* Case Investigation, and review the responses for Question 6.

**Question 1:** Compare Questionnaire 1: Poultry Exposure with your responses from *Salmonella* Scare. Which essential questions or themes from Questionnaire 1: Poultry Exposure did you not include in your original version? Choose up to 5.

## Case Overview

In early 2014, epidemiologists identified five clusters of human *Salmonella* infections using PulseNet. PulseNet is an online surveillance system that compares the DNA fingerprints of bacteria from people around the United States to find clusters of disease that might represent unrecognized outbreaks. Many ill persons in each of the five clusters reported contact with live poultry, primarily chicks and ducklings. Since the poultry was from the same mail-order hatchery, the epidemiologists decided to merge the clusters into a single investigation. During February 3–October 14, 2014, a total of 363 persons infected with outbreak strains of *Salmonella* serotypes Infantis, Newport, and Hadar were reported from 43 states and Puerto Rico, making it the largest live poultry-associated salmonellosis outbreak reported in the United States.<sup>10,11</sup>

Among the ill persons, 35% (122 of 353) were aged  $\leq 10$  years, and 33% (76 of 233) were hospitalized; no deaths were reported. Among those interviewed, 76% (174 of 230) reported live poultry contact in the week before illness onset. Among the ill persons who provided supplemental information regarding live poultry exposure, 80% (94 of 118) reported chick exposure and 26% (31 of 118) reported duckling exposure. Among 96 (81%) ill persons who were exposed to live poultry at their residence, 28 (29%) reported keeping poultry inside their home instead of outdoors, and 26 (27%) reported no direct contact with their poultry.<sup>12</sup>

**Question 2:** After the information from the questionnaires has been compiled, how might an epidemiologist organize the information found to learn more about the outbreak?

<sup>10</sup>More information on this outbreak can be found at: <http://www.cdc.gov/salmonella/live-poultry-05-14/index.html>.

<sup>11</sup>CDC. Notes from the Field: Multistate Outbreak of Human Salmonella Infections Linked to Live Poultry from a Mail-Order Hatchery in Ohio - February-October 2014, Morbidity and Mortality Weekly Report (MMWR), available at: <https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6409a5.htm>.

<sup>12</sup> CDC. Notes from the Field: Multistate Outbreak of Human Salmonella Infections Linked to Live Poultry from a Mail-Order Hatchery in Ohio — February–October 2014. *Morbidity and Mortality Weekly Report (MMWR)*, March 13, 2015; 64(09):258. Available at: <https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6409a5.htm>

**Question 3.** Describe the outbreak by person, place, and time by using the 5 W's.

Who?

What?

When?

Where?

Why?

**Question 4:** What is a zoonotic disease? Knowing that *Salmonella* is classified as a zoonotic disease, use context clues from the scenario to develop a definition in your own words. Provide your reasoning below your definition.

## One Health

The One Health concept recognizes that the health of humans is connected to the health of animals and the environment. Multiple examples show how the health of people is related to the health of animals and the environment.<sup>13</sup>

Studies have reported that the bond between people and their pets can increase fitness, lower stress, and bring happiness to their owners. However, something else you should know is that pets sometimes carry germs that can make people sick. The diseases shared between people and animals are known as zoonotic (zoe-oh-NOT-ic) diseases.<sup>14</sup>

**Question 4:** Was your definition from Question 3 accurate? Explain why or why not by using specific examples from the text.

Zoonotic diseases can be caused by harmful germs, including viruses, bacteria, parasites, and fungi. These diseases are very common. Scientists estimate that approximately 6 of every 10 known infectious diseases in humans are spread from animals.

Many people interact with animals in their daily lives, both at home and away from home. Pets offer companionship and entertainment, with millions of households having one or more pets. We might come into close contact with animals at a county fair or petting zoo, or encounter wildlife while enjoying outdoor activities. Also, animals are an important food source and provide meat, dairy, and eggs.

Keeping backyard poultry (chicks, chickens, ducks, ducklings, geese, and turkeys) is becoming more and more popular. People enjoy raising baby chicks and having fresh eggs from their established flocks. Although keeping chickens can be fun and educational, poultry owners should be aware that chickens and other birds used for meat and eggs can carry germs that make people sick. Germs from these birds can cause different of illnesses in people, ranging from minor skin infections to serious illnesses that can cause death.<sup>15</sup>

<sup>13</sup> More information about One Health can be found at: <http://www.cdc.gov/onehealth/about.html>

<sup>14</sup> More information about Healthy Pets and Healthy People can be found at: <http://www.cdc.gov/healthypets/index.html>

<sup>15</sup> More information about Backyard Poultry can be found at: <https://www.cdc.gov/healthypets/pets/farm-animals/backyard-poultry.html>.

**Question 5:** What precautions could have been taken to prevent the infection and spread of this particular *Salmonella* outbreak?

**Question 6:** What role does One Health have in Public Health? Investigate this question by categorizing your prevention strategies from Question 5 into the graphic organizer below.

<b>Human</b>	<b>Animal</b>	<b>Environment</b>

**Question 7:** Analyze Figures 2, 3, and 4. Are these effective posters? Explain why or why not. Then, decide where you might distribute each poster to reach its target audience. Example locations: feed store, elementary school, doctor office in town where outbreaks occurred.

Use the table below to organize your answer.

**Answer:** Interpretations may vary, see below for examples.

<b>Figure 2</b>	<b>Figure 3</b>	<b>Figure 4</b>
<b>Is it effective? Why or why not?</b>	<b>Is it effective? Why or why not?</b>	<b>Is it effective? Why or why not?</b>
<b>Where might you post this flyer? Why?</b>	<b>Where might you post this flyer? Why?</b>	<b>Where might you post this flyer? Why?</b>



## Worksheet 2B

# Part 2: Don't Let *Salmonella* Ruffle Your Feathers

## 2014 Multistate Outbreak of *Salmonella*, Guide

Name: \_\_\_\_\_

Date: \_\_\_\_\_

### Directions:

### Comparing Questionnaires

Obtain Worksheet 1A: *Salmonella* Case Investigation, and review the responses for Question 6.

**Question 1:** Compare Questionnaire 1: Poultry Exposure with your responses from *Salmonella* Scare. Which essential questions or themes from Questionnaire 1: Poultry Exposure did you not include in your original version? Choose up to 5.

**Answer:** Answers will vary based on the students' responses to Question 6 from Worksheet 1A.

Sample answers may include:

- During the 7 days before becoming ill, did [you/your child] have any contact with baby or adult poultry?
- What type of poultry or animal did the person come into contact with?
- Where were the baby poultry purchased? (Please collect as much available information as possible, such as store name, location, and address.)

## Case Overview

In early 2014, epidemiologists identified five clusters of human *Salmonella* infections using PulseNet. PulseNet is an online surveillance system that compares the DNA fingerprints of bacteria from people around the United States to find clusters of disease that might represent unrecognized outbreaks. Many ill persons in each of the five clusters reported contact with live poultry, primarily chicks and ducklings. Since the poultry was from the same mail-order hatchery, the epidemiologists decided to merge the clusters into a single investigation. During February 3–October 14, 2014, a total of 363 persons infected with outbreak strains of *Salmonella* serotypes Infantis, Newport, and Hadar were reported from 43 states and Puerto Rico, making it the largest live poultry-associated salmonellosis outbreak reported in the United States.<sup>16,17</sup>

Among the ill persons, 35% (122 of 353) were aged  $\leq 10$  years, and 33% (76 of 233) were hospitalized; no deaths were reported. Among those interviewed, 76% (174 of 230) reported live poultry contact in the week before illness onset. Among the ill persons who provided supplemental information regarding live poultry exposure, 80% (94 of 118) reported chick exposure and 26% (31 of 118) reported duckling exposure. Among 96 (81%) ill persons who were exposed to live poultry at their residence, 28 (29%) reported keeping poultry inside their home instead of outdoors, and 26 (27%) reported no direct contact with their poultry.<sup>18</sup>

**Question 2:** After the information from the questionnaires has been compiled, how might an epidemiologist organize the information found to learn more about the outbreak?

**Answer:** An epidemiologist would organize the information found using descriptive epidemiology. This will help describe the outbreak by person, place, and time.

<sup>16</sup>More information on this outbreak can be found at: <http://www.cdc.gov/salmonella/live-poultry-05-14/index.html>.

<sup>17</sup>CDC. Notes from the Field: Multistate Outbreak of Human Salmonella Infections Linked to Live Poultry from a Mail-Order Hatchery in Ohio - February-October 2014, Morbidity and Mortality Weekly Report (MMWR), available at: <https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6409a5.htm>.

<sup>18</sup>CDC. Notes from the Field: Multistate Outbreak of Human Salmonella Infections Linked to Live Poultry from a Mail-Order Hatchery in Ohio — February–October 2014. *Morbidity and Mortality Weekly Report (MMWR)*, March 13, 2015; 64(09):258. Available at: <https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6409a5.htm>

**Question 3.** Describe the outbreak by person, place, and time by using the 5 W's.

Who? 363 people (Answer)

What? Laboratory confirmed *Salmonella* serotypes Infantis, Newport, and Hadar infection (Answer)

When? February 3–October 14, 2014 (Answer)

Where? Multiple states (Answer)

Why? Contact with live poultry, primarily chicks and ducklings, from a single mail-order hatchery (Answer)

**Question 4:** What is a zoonotic disease? Knowing that *Salmonella* is classified as a zoonotic disease, use context clues from the scenario to develop a definition in your own words. Provide your reasoning below your definition.

**Note:** Definitions will vary. Students should consider the origin of each part of the word, where “zoo” means “animal life” in Greek and “not” means “marked by” in Latin, and “otic” means “of, relating to, or characterized by a (specified) action, process, or condition.” Together, a definition might be written as “a disease that can be shared between animals and people.” Note that “between” is a key word as many of these diseases can spread from an animal to a person or from a person to an animal. Students can provide examples of how they inferred that “zoo” has something to do with animal by providing information from the scenario, including that 76% (174 of 230) cases reported live poultry contact in the week before illness onset.

**Answer:** A zoonotic disease is a disease that can be spread between animals and people.

## One Health

The One Health concept recognizes that the health of humans is connected to the health of animals and the environment. Multiple examples show how the health of people is related to the health of animals and the environment.<sup>19</sup>

Studies have reported that the bond between people and their pets can increase fitness, lower stress, and bring happiness to their owners. However, something else you should know is that pets sometimes carry germs that can make people sick. The diseases shared between people and animals are known as zoonotic (zoe-oh-NOT-ic) diseases.<sup>20</sup>

**Question 4:** Was your definition from Question 3 accurate? Explain why or why not by using specific examples from the text.

**Answer:** Answers will vary. A sample answer might be: yes, because a zoonotic disease is classified as a disease shared between animals and people, and those infected with *Salmonella* reported contact with live poultry, primarily chicks and ducklings.

Zoonotic diseases can be caused by harmful germs, including viruses, bacteria, parasites, and fungi. These diseases are very common. Scientists estimate that approximately 6 of every 10 known infectious diseases in humans are spread from animals.

Many people interact with animals in their daily lives, both at home and away from home. Pets offer companionship and entertainment, with millions of households having one or more pets. We might come into close contact with animals at a county fair or petting zoo, or encounter wildlife while enjoying outdoor activities. Also, animals are an important food source and provide meat, dairy, and eggs.

Keeping backyard poultry (chicks, chickens, ducks, ducklings, geese, and turkeys) is becoming more and more popular. People enjoy raising baby chicks and having fresh eggs from their established flocks. Although keeping chickens can be fun and educational, poultry owners should be aware that chickens and other birds used for meat and eggs can carry germs that make people sick. Germs from these birds can cause different of illnesses in people, ranging from minor skin infections to serious illnesses that can cause death.<sup>21</sup>

<sup>19</sup> More information about One Health can be found at: <http://www.cdc.gov/onehealth/about.html>

<sup>20</sup> More information about Healthy Pets and Healthy People can be found at: <http://www.cdc.gov/healthypets/index.html>

<sup>21</sup> More information about Backyard Poultry can be found at: <https://www.cdc.gov/healthypets/pets/farm-animals/backyard-poultry.html>.

**Question 5:** What precautions could have been taken to prevent the infection and spread of this particular *Salmonella* outbreak?

**Answer:**

**Do**

- Always wash hands thoroughly with soap and water right after touching live baby poultry or anything in the area where they live and roam. Use hand sanitizer if soap and water are not readily available.
- Adults should supervise hand washing for young children.
- Clean any equipment or materials associated with raising or caring for live poultry outside the house, such as cages or feed or water containers.
- Give live poultry their own space to live, outside of your home.

**Don't**

- Allow children younger than age 5, older adults, or people with weakened immune systems to handle or touch chicks, ducklings, or other live poultry.
- Snuggle or kiss the birds, touch your mouth, or eat or drink around live baby poultry.
- Allow live baby poultry inside the house, in bathrooms, or especially in areas where food or drink is prepared, served, or stored, such as kitchens or outdoor patios.
- Eat or drink in the area where the birds live or roam.
- Give live baby poultry as gifts to young children.

Source: Centers for Disease Control and Prevention:

<http://www.cdc.gov/Features/SalmonellaBabyBirds/index.html>

**Question 6:** What role does One Health have in Public Health? Investigate this question by categorizing your prevention strategies from Question 5 into the graphic organizer below.

**Note:** Students might have difficulty placing prevention strategies into a single category because of the difficulty separating the interconnections between humans, animals, and our environment. To visualize the relationships between each prevention method, use different colors to highlight each method. For example, the method “Adults should supervise hand washing for young children” could be highlighted blue for environment and red for human influences.

**Answer:** Responses will vary; see examples below. More information on prevention can be found at: <http://www.cdc.gov/Features/SalmonellaBabyBirds/index.html>.

<b>Human</b>	<b>Animal</b>	<b>Environment</b>
<ul style="list-style-type: none"> <li>• Adults should supervise hand washing for young children.</li> <li>• Always wash hands thoroughly with soap and water right after touching live baby poultry or anything in the area where they live and roam. Use hand sanitizer if soap and water are not readily available.</li> <li>• Children younger than age 5 years, older adults, or people with weakened immune systems should not handle or touch chicks, ducklings, or other live poultry.</li> <li>• Don't snuggle or kiss the birds, touch your mouth, or eat or drink around live baby poultry.</li> </ul>	<ul style="list-style-type: none"> <li>• Give live poultry their own space to live, outside of your home.</li> <li>• Don't give live baby poultry as gifts to young children.</li> </ul>	<ul style="list-style-type: none"> <li>• Clean any equipment or materials associated with raising or caring for live poultry outside the house, such as cages or feed or water containers.</li> <li>• Don't let live baby poultry inside the house, in bathrooms, or especially in areas where food or drink is prepared, served, or stored, such as kitchens or outdoor patios.</li> <li>• Don't eat or drink in the area where the birds live or roam.</li> </ul>

**Question 7:** Analyze Figures 2, 3, and 4. Are these effective posters? Explain why or why not. Then, decide where you might distribute each poster to reach its target audience. Example locations: feed store, elementary school, doctor office in town where outbreaks occurred.

Use the table below to organize your answer.

**Answer:** Interpretations may vary, see below for examples.

<b>Figure 2</b>		<b>Figure 4</b>
<b>Is it effective? Why or why not?</b>	<b>Is it effective? Why or why not?</b>	<b>Is it effective? Why or why not?</b>
<ul style="list-style-type: none"> <li>Effective at addressing many animals and handling practices (Sample Answer)</li> </ul>	<ul style="list-style-type: none"> <li>Provides specific instructions for those who had contact with poultry (Sample Answer)</li> </ul>	<ul style="list-style-type: none"> <li>Yes, but it could also include specific information regarding those who are at risk. (Sample Answer)</li> </ul>
<b>Where might you post this flyer? Why?</b>	<b>Where might you post this flyer? Why?</b>	<b>Where might you post this flyer? Why?</b>
<ul style="list-style-type: none"> <li>Feed or farm stores because people who have backyard flocks and want more information may be more likely to shop there. (Sample Answer)</li> </ul>	<ul style="list-style-type: none"> <li>Schools or petting zoos where there may be access to ducklings or chicks among people who do not normally have access to them. (Sample Answer)</li> </ul>	<ul style="list-style-type: none"> <li>Feed or farm stores because people who are interested in having backyard flocks may be looking to buy ducklings or chicks there. (Sample Answer)</li> </ul>



# Figure 1: Questionnaire

Available online at: [http://www.cifor.us/clearinghouse/uploads/NationalHoQues\\_Fillable\\_OMB0920-0997.pdf?CFID=21919678&#38;CFTOKEN=16531536&#38;jsessionid=0E4990498FC752278DC283B8D8C39AC7.cfusion](http://www.cifor.us/clearinghouse/uploads/NationalHoQues_Fillable_OMB0920-0997.pdf?CFID=21919678&#38;CFTOKEN=16531536&#38;jsessionid=0E4990498FC752278DC283B8D8C39AC7.cfusion)

Hypothesis Generating Questionnaire for <input type="text"/>		Form approved OMB No. 0920-0997 Expires 10/31/2016		
PulseNet Cluster Code <input type="text"/>		Enter Pathogen (e.g., Salmonella Typhimurium)		
<b>Section 1: Interviewer information</b> (Questions 1-5 to be completed by interviewer prior to questionnaire administration)				
1. PulseNet ID #: <input type="text"/>	2. State/Local/Other ID #: <input type="text"/>			
3. Date of Interview (must enter MM/DD/YYYY) <input type="text"/>				
4. Interviewer Information Name <input type="text"/>		Contact Phone Number <input type="text"/>		
Agency or Organization <input type="text"/>				
5. Before this interview how many times has the case been interviewed about their illness? <input type="radio"/> None <input type="radio"/> Once <input type="radio"/> Twice <input type="radio"/> Three Times <input type="radio"/> Other (Specify) <input type="text"/> <input type="radio"/> Unknown				
6. Respondent was: <input checked="" type="radio"/> Self <input type="radio"/> Parent <input type="radio"/> Spouse <input type="radio"/> Other (Specify) <input type="text"/>				
<b>Section 2: Demographic Data:</b> I'd like to begin by asking a few questions about yourself (your child) and your household.				
1. What are your state, county, and zip code? State <input type="text"/> County <input type="text"/> Zip Code <input type="text"/>				
2. Birth month (must enter 1-12) <input type="text"/> Birth year (must enter YYYY) <input type="text"/>		3. Sex <input type="radio"/> Male <input type="radio"/> Female <input type="radio"/> Unknown		
4. Hispanic or Latino origin: <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Unknown				
5. How would you describe your race? <input type="radio"/> White <input type="radio"/> Black/African American <input type="radio"/> American Indian/Alaska Native <input type="radio"/> Asian <input type="radio"/> Native Hawaiian/Other Pacific Islander <input type="radio"/> Other (Specify) <input type="text"/> <input type="radio"/> Unknown				
<b>Section 3: Clinical Information:</b> Now I have a few questions about your (your child's) illness.				
1. What date did you first feel sick? (must enter MM/DD/YYYY) <input type="text"/>				
YES	Maybe	NO	Don't Know	Did/Were you (your child)
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	2. Have any diarrhea (defined as at least 3 loose stools in 24 hours)
<input type="radio"/> YES <input type="radio"/> Maybe <input type="radio"/> NO <input type="radio"/> Don't Know				2a. What day did it start? (must enter MM/DD/YYYY) <input type="text"/>
<input type="radio"/> YES <input type="radio"/> Maybe <input type="radio"/> NO <input type="radio"/> Don't Know				3. Hospitalized overnight?
<input type="radio"/> YES <input type="radio"/> Maybe <input type="radio"/> NO <input type="radio"/> Don't Know				4. Have any close contact with anyone with diarrhea or vomiting?
<input type="radio"/> YES <input type="radio"/> Maybe <input type="radio"/> NO <input type="radio"/> Don't Know				4a. When was this person ill <input type="radio"/> less than 24 hours before you <input type="radio"/> ≥ 24 hours before you <input type="radio"/> Unknown
5. How many days total were you sick? <input type="text"/> or <input type="radio"/> Still Ill				
<b>Section 4: Travel:</b> Next I have a couple of questions about any travel you (your child) might have done, either as part of your work or for pleasure.				
YES	Maybe	NO	Don't Know	Did/Were you (your child)
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	1. Did you spend all, or some, of the 7 days before you were ill outside your home state?
<input type="radio"/> YES <input type="radio"/> Maybe <input type="radio"/> NO <input type="radio"/> Don't Know				1a. List all US states where you might have purchased or eaten foods. This would include foods eaten at airports, bus or train stations. Enter 2-letter postal abbrv(s): <input type="text"/>
<input type="radio"/> YES <input type="radio"/> Maybe <input type="radio"/> NO <input type="radio"/> Don't Know				<input type="radio"/> Unknown <input type="radio"/> Did not travel to other US states
<input type="radio"/> YES <input type="radio"/> Maybe <input type="radio"/> NO <input type="radio"/> Don't Know				1b. List all countries outside the US where you might have purchased or eaten foods. List countries & travel dates <input type="text"/>
<input type="radio"/> YES <input type="radio"/> Maybe <input type="radio"/> NO <input type="radio"/> Don't Know				<input type="radio"/> Unknown <input type="radio"/> Did not travel outside the US
* If the case spent the entire 7 days before illness onset outside the US, please be sure countries and travel dates are noted and skip to the end of the interview (page 11).				
* If the case spent only part of the 7 days before illness onset outside the US, please complete the remainder of the interview collecting only foods purchased or eaten in the US.				
<b>Section 4 Comments.</b> Please fill in any comments/notes from this section in the space provided <input type="text"/>				

**Section 5: Food allergies, special diets, vitamins, & supplements:** Now I have a few questions about food allergies and any special diets you (your child) may follow. I will also ask a few questions about vitamins and supplements you may have taken in the 7 days before your illness began.

YES	Maybe	NO	Don't Know	Did you (your child) have:
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	1. Any allergies that prevent you from eating a certain food(s)?
				1a. What foods? <input type="radio"/> milk <input type="radio"/> eggs <input type="radio"/> peanuts <input type="radio"/> tree nuts <input type="radio"/> fish Please check all that apply <input type="radio"/> soy <input type="radio"/> wheat <input type="radio"/> shellfish <input type="radio"/> other (Specify) <input type="text"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	2. Vegetarian or vegan diet?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	3. Special or restricted diet (medical, weight-loss, religious, cultural, etc.)?
				3a. Please describe: <input type="text"/> <input type="radio"/> Unknown
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	4. Any commercially bottled water in personal-sized containers?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	5. Any commercially bottled water in large, multi-user tanks or water coolers?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	6. Any vitamins, nutritional or herbal supplements, such as teas, tablets, and pills, etc.?
				6a. Please describe type, variety, brand: <input type="text"/> <input type="radio"/> Unknown
<b>Section 5 Comments.</b> Please fill in any comments/notes from this section in the space provided				<input type="text"/>

**For Sections 6 and 7:** Read each type of store, point of purchase, or food outlet in the top section and ask respondent to list names for each category. The lists of store/restaurant types are meant to prompt the respondent. Please list the names of all points of purchase/restaurants mentioned, regardless of category, in the space provided below. You do not need to record a yes or no response for each category, only record the specific names and approximate locations reported in the space below.

**Section 6: Sources of food at home:** Now I have a few questions about where the food came from that you ate at home in the 7 days before your illness began. This isn't necessarily where you shopped during that week, but where what you actually ate came from. I'm going to list several types of stores, for each type please tell me the names of each store you would have eaten food from during the 7 days before you were sick.

1. Did you (your child) eat foods from?

Grocery stores or Supermarkets	Health food stores or Co-ops
Warehouse stores such as Costco or Sam's Club	Fish or meat specialty shops (butcher's shop, etc.)
Small markets or Mini markets (convenience stores, gas stations, etc.)	Farmer's markets, Roadside stands, Open-air markets, or food purchased directly from a farm
Ethnic specialty markets ( Mexican, Asian, or Indian groceries)	Any other sources of food at home that you ate during the 7 days before your illness began?

List Store/Retail Names and Locations:

**Section 7: Sources of food outside the home:** Now I have a few questions about where the food came from that you ate outside your home such as restaurants or fast food chains. I'm going to list several types of restaurant, for each type please tell me the names of each place you would have eaten food from during the 7 days before you were sick.

1. Did you (your child) eat foods from?

National fast food chains	Vegetarian or Vegan	All-you-can-eat Buffet
Mexican-style	Barbeque or Home-style	Sandwich shops or Delis
Italian	Steakhouse or Grill	Any take away/ take-out food
Seafood	Diner or Neighborhood Café	Breakfast or Brunch-style
Jamaican, Cuban, or Caribbean	Middle Eastern, Arabic, Lebanese, or African	A school or other institutional setting
Chinese, Indian, Japanese or other Asian-style	An event where food was served, such as a catered event, food festival, church or community meal, etc.	Any other restaurants or places you might have eaten at in the 7 days before your illness began?

List Store/Retail Names and Locations:

**Section 8: Meat and Poultry:** Now I have a few questions about meat and poultry that you (your child) might have eaten in the 7 days before your (your child's) illness began. This does not include canned items, but the meat and poultry could have been fresh, frozen, or could have been eaten as part of dish. You (your child) could have eaten these either in your home or outside the home. As I read each food, please answer as yes, no, may have eaten, or can't remember eating the food in the 7 days before you (your child) got sick.

**First, I have questions about CHICKEN & OTHER POULTRY products.**

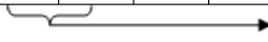
YES	Maybe	NO	Don't Know	Did you (your child) eat any:
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	1. Whole chicken or cut chicken pieces/parts?
				1a. If eaten <u>at home</u> , what was the: Type, variety, brand: <input type="text"/> Place purchased from (names, locations): <input type="text"/> <input type="radio"/> Not applicable (did not eat <u>at home</u> )
				1b. If eaten <u>outside the home</u> , where? List name(s) and location(s): <input type="text"/> <input type="radio"/> Not applicable (did not eat <u>outside the home</u> )
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	2. Ground chicken?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	3. Breaded chicken products, such as chicken tenders, strips, or nuggets?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	4. Stuffed, frozen chicken products, such as chicken Kiev or chicken Cordon Bleu?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	5. Any other frozen chicken products?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	6. Duck, game hen, or squab?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	7. Whole turkey or cut turkey pieces/parts?
				7a. If eaten <u>at home</u> , what was the: Type, variety, brand: <input type="text"/> Place purchased from (names, locations): <input type="text"/> <input type="radio"/> Not applicable (did not eat <u>at home</u> )
				7b. If eaten <u>outside the home</u> , where? List name(s) and location(s): <input type="text"/> <input type="radio"/> Not applicable (did not eat <u>outside the home</u> )
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	8. Ground Turkey?

**Section 8 Chicken/Poultry Comments.** Please fill in comments/notes from this section in the space provided

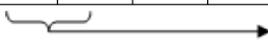
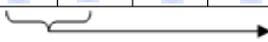
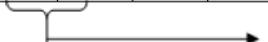
**Section 8 Chicken/Poultry Comments.** Please fill in comments/notes from this section in the space provided

**Now I have questions about BEEF products**

YES	Maybe	NO	Don't Know	In the 7 days before the illness began, did you (your child) eat any:
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	9. Beef steaks or roasts?
				9a. If eaten <u>at home</u> , what was the: Type, variety, brand: <input type="text"/> Place purchased from (names, locations): <input type="text"/> <input type="radio"/> Purchased Frozen <input type="radio"/> Purchased Fresh <input type="radio"/> Was pink or red inside when eaten <input type="radio"/> Not applicable (did not eat <u>at home</u> )
				9b. If eaten <u>outside the home</u> , where? List name(s) and location(s): <input type="text"/> <input type="radio"/> Not applicable (did not eat <u>outside the home</u> )
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	10. Pre-made or pre-formed hamburger patties <u>at home</u> ?
				10a. If eaten <u>at home</u> , what was the: Type, variety, brand: <input type="text"/> Place purchased from (names, locations): <input type="text"/> <input type="radio"/> Was pink or red inside when eaten
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	11. Any fresh hamburger patties <u>at home</u> ?
				11a. If eaten <u>at home</u> , what was the: Type, variety, brand: <input type="text"/> Place purchased from (names, locations): <input type="text"/> <input type="radio"/> Was pink or red inside when eaten

YES	Maybe	NO	Don't Know	Did you (your child) eat any:
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	12. Any dish with ground beef <u>at home</u> , such as casseroles, tacos, soups, or pasta sauces?
				12a. If eaten <u>at home</u> : Please describe the dish: <input type="text"/> Place purchased from (names, locations): <input type="text"/> <input type="radio"/> Not applicable (did not eat <u>at home</u> )
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	13. Any ground beef <u>outside the home</u> ? This could include foods such as hamburger or other dishes such as casseroles, tacos, soups, or pasta sauces.
				13a. Where did you eat this? Place purchased from (names, locations): <input type="text"/> <input type="radio"/> Not applicable (did not eat <u>at home</u> )
<b>Section 8 Beef Comments.</b> <i>Please fill in comments/notes from this section in the space provided</i>				<input type="text"/>

**Now I have questions about PORK, LAMB, & OTHER MEAT products**

YES	Maybe	NO	Don't Know	In the 7 days before the illness began, did you (your child) eat any:
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	14. Ground pork?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	15. Any other pork product?
				15a. What was the type, variety, brand: <input type="text"/> <input type="radio"/> Unknown
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	16. Lamb?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	17. Bacon?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	18. Sausage?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	19. Hot dogs, corn dogs, polish sausage, kielbasa, or similar product?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	20. Pepperoni? This could have been on a sandwich or pizza.
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	21. Any other Italian-style meats, such as salami or prosciutto?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	22. Bologna, pastrami, or corned beef?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	23. Store-bought, dried meat strips or jerky?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	24. Pre-packaged deli meats?
				24a. If eaten <u>at home</u> , what was the: Type, variety, brand: <input type="text"/> Place purchased from (names, locations): <input type="text"/> <input type="radio"/> Not applicable (did not eat <u>at home</u> )
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	25. Any other deli-sliced meat (not pre-packaged)?
				25a. If eaten <u>at home</u> , what was the: Type, variety, brand: <input type="text"/> Place purchased from (names, locations): <input type="text"/> <input type="radio"/> Not applicable (did not eat <u>at home</u> )
				25b. If eaten <u>outside the home</u> , where? List name(s) and location(s): <input type="text"/> <input type="radio"/> Not applicable (did not eat <u>outside the home</u> )
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	26. Any other meat and/or poultry products, not mentioned already?
<b>Section 8 Pork, Lamb, Other Meats Comments.</b> <i>Please fill in comments/notes from this section in the space provided</i>				<input type="text"/>

**Section 9: Fish and Seafood:** Now I have some questions about fish and seafood you (your child) might have eaten in the 7 days before your (your child's) illness began. You (your child) may have eaten this at home or away from home. This does not include canned items, but these foods could have been eaten alone or as part of a dish, sauce, or dip. As I read each food, please answer as yes, no, may have eaten, or can't remember eating the food in the 7 days before you (your child) got sick.

YES	Maybe	NO	Don't Know	Did you (your child) eat any:
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	1. Fresh or fresh-frozen fish?

YES	Maybe	NO	Don't Know	Did you (your child) eat any:
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	2. Smoked or dried fish?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	3. Shrimp or prawns?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	4. Crab, lobster, or crayfish?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	5. Oysters?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	6. Clams, mussels, scallops, or other shellfish?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	7. Sushi (with raw fish or seafood)?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	8. Frozen fish product (fish sticks, nuggets, etc.)?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	9. Any other fish or seafood?
}				9a. What was the type, variety, brand: <input type="text"/> <input type="radio"/> Unknown
<b>Section 9 Comments.</b> Please fill in comments/notes from this section in the space provided				
<b>Section 10: Eggs, Dairy, and Cheese:</b> Now I have a few questions about eggs, dairy, and cheese products you (your child) might have eaten in the 7 days before your (your child's) illness began. You (your child) could have eaten these either in your home or away from home. As I read each food, please answer as yes, no, may have eaten, or can't remember eating the food in the 7 days before you (your child) got sick.				
YES	Maybe	NO	Don't Know	Did you (your child) eat any:
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	1. Eggs or egg-containing dishes?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	1a. Were they raw, "runny", or "over-easy"?
}				1b. If eaten <u>at home</u> , what was the: Type, variety, brand: <input type="text"/>
}				Place purchased from (names, locations): <input type="text"/> <input type="radio"/> Not applicable (did not eat <u>at home</u> )
}				1c. If eaten <u>outside the home</u> , where? List name(s) and location(s): <input type="text"/>
}				Describe the dish: <input type="text"/> <input type="radio"/> Not applicable (did not eat <u>outside the home</u> )
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	2. Anything made with raw eggs (cookie dough, cake batter, sauces, homemade ice cream or mayo, etc.)?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	3. Milk?
}				3a. What was the type, variety, brand: <input type="text"/> <input type="radio"/> Unknown
}				3b. Raw or unpasteurized? <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Maybe <input type="radio"/> Unknown
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	4. Ice cream or ice cream products?
}				4a. If eaten <u>at home</u> , what was the: Type or brand (bar, tub, carton, etc.) <input type="text"/>
}				Variety or flavor? <input type="text"/> <input type="radio"/> Unknown
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	5. Frozen yogurt?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	6. Yogurt drinks?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	7. Any other yogurt?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	8. Prepackaged, shredded cheese?
}				8a. What was the type, variety, brand: <input type="text"/> <input type="radio"/> Unknown
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	9. Processed, sliced cheese?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	10. Block-type cheese (cheddar, Swiss, Colby, Jack, etc.)?
}				10a. What was the type, variety, brand: <input type="text"/> <input type="radio"/> Unknown
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	11. String-type cheese?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	12. Cottage cheese?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	13. Cheese curds?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	14. Feta cheese? This could have been part of a dish or salad.

YES	Maybe	NO	Don't Know	In the 7 days before the illness began, did you (your child) eat any:
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	15. Blue veined cheese (gorgonzola, bleu)?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	16. Fresh or dried Parmesan, Romano, or similar cheese?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	17. Cheese from raw/unpasteurized milk (homemade, farm-fresh, door-to-door cheeses)?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	18. Mexican-style soft cheese (queso fresco, queso blanco)?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	18b. Was it homemade?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	19. Any other gourmet or artisanal cheese?
<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>				19a. What was the type, variety, brand: <input type="text"/> <input type="radio"/> Unknown
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	20. Any other dairy product?
<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>				20a. What was the type, variety, brand: <input type="text"/> <input type="radio"/> Unknown
<b>Section 10 Comments.</b> Please fill in comments/notes from this section in the space provided				<input type="text"/>

**Section 11: Fresh fruits:** Now I have some questions about fresh fruits, not canned, cooked, or frozen, you (your child) might have eaten in the 7 days before your (your child's) illness began. You (your child) could have eaten these either in your home or away from home. As I read each food, please answer as yes, no, may have eaten, or can't remember eating the food in the 7 days before you (your child) got sick.

YES	Maybe	NO	Don't Know	Did you (your child) eat any:
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	1. Apples?
<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>				1a. What was the type, variety, brand: <input type="text"/> <input type="radio"/> Unknown
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	2. Grapes?
<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>				2a. What was the type, variety, brand: <input type="text"/> <input type="radio"/> Unknown
<input type="checkbox"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	3. Pears?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	4. Peaches?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	5. Nectarines?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	6. Apricots?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	7. Plums?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	8. Oranges?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	9. Grapefruit?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	10. Tangerines?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	11. Fresh lemon or lime? This could include garnishes on a drink, etc.
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	12. Strawberries?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	13. Raspberries?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	14. Blueberries?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	15. Blackberries?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	16. Cherries?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	17. Any other fresh berries?
<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>				17a. What was the type, variety, brand: <input type="text"/> <input type="radio"/> Unknown
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	18. Cantaloupe?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	19. Honeydew melon?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	20. Watermelon?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	21. Precut melon or melon salad? Sometimes served on salad bars or breakfast buffets
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	22. Any other melon?

YES	Maybe	NO	Don't Know	Did you (your child) eat any:
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	23. Pineapple?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	24. Mango?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	25. Coconut (whole or shredded)?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	26. Any other tropical fruit (kiwi, papaya, guava, pomegranate, etc.)?
				26a. What was the type, variety, brand: <input type="text"/> <input type="checkbox"/> Unknown
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	27. Frozen berries?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	28. Other frozen fruit?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	29. Raisins?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	30. Other dried fruit?
				30a. What was the type, variety, brand: <input type="text"/> <input type="checkbox"/> Unknown
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	31. Apple juice (not from concentrate)?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	32. Orange juice (not from concentrate)?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	33. Any other juice (not from concentrate)?
				33a. What was the type, variety, brand: <input type="text"/> <input type="checkbox"/> Unknown
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	34. Juice from frozen concentrate?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	35. Any unpasteurized or raw juices or ciders?
<b>Section 11 Comments.</b> Please fill in comments/notes from this section in the space provided				<input type="text"/>

**Section 12: Fresh Vegetable:** Now I have some questions about fresh vegetables you (your child) might have eaten raw or uncooked in the 7 days before your (your child's) illness began. You (your child) could have eaten these either in your home or away from home. This does not include canned items, but these foods could have been eaten alone or as part of a dish. I am only interested in vegetables that are not grown at home. As I read each food, please answer as yes, no, may have eaten, or can't remember eating the food in the 7 day before you (your child) got sick.

**First, I have questions about TOMATOES & LEAFY GREENS**

YES	Maybe	NO	Don't Know	Did you (your child) eat any:
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1. Fresh tomatoes?
				1a. If eaten <u>at home</u> , what <input type="checkbox"/> Red Round <input type="checkbox"/> Roma <input type="checkbox"/> Cherry <input type="checkbox"/> Grape was the type, variety: <input type="checkbox"/> 'Vine-ripe', sold on the vine <input type="checkbox"/> other (Specify) <input type="text"/> <input type="checkbox"/> Unknown
				Place purchased from (names, locations): <input type="text"/> <input type="checkbox"/> Not applicable (did not eat <u>at home</u> )
				1b. If eaten <u>outside the home</u> , where? List name(s) and location(s): <input type="text"/> <input type="checkbox"/> Not applicable (did not eat <u>outside the home</u> )
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2. Fresh tomatoes on sandwich, burger, or salad?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3. Fresh salsa or pico de gallo (not from a jar or can)?
				3a. If eaten <u>at home</u> , what was the: Type, variety (red, green): <input type="text"/>
				Place purchased from (names, locations): <input type="text"/> <input type="checkbox"/> Not applicable (did not eat <u>at home</u> )
				3b. If eaten <u>outside the home</u> , where? List name(s) and location(s): <input type="text"/> <input type="checkbox"/> Not applicable (did not eat <u>at home</u> )
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4. Guacamole?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5. Fresh, uncooked leafy greens such as spinach, lettuce, etc.?
				5a. Prepackaged or loose? <input type="checkbox"/> Prepackaged <input type="checkbox"/> Loose <input type="checkbox"/> Unknown
				5b. If eaten <u>at home</u> , what was the: Type, variety, brand: <input type="text"/>
				Place purchased from (names, locations): <input type="text"/> <input type="checkbox"/> Not applicable (did not eat <u>at home</u> )
				5c. If eaten <u>outside the home</u> , where? List name(s) and location(s): <input type="text"/> <input type="checkbox"/> Not applicable (did not eat <u>outside the home</u> )

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	6. Lettuce on a sandwich, burger, or as garnish?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	7. Iceberg lettuce?
				7a. Prepackaged or head/loose? <input type="checkbox"/> Prepackaged <input type="checkbox"/> Head/Loose <input type="checkbox"/> Unknown
				7b. If eaten <u>at home</u> , what was the: Type, variety, brand: <input type="text"/> Place purchased from (names, locations): <input type="text"/> <input type="checkbox"/> Not applicable (did not eat <u>at home</u> )
				7c. If eaten <u>outside the home</u> , where? List name(s) and location(s): <input type="text"/> <input type="checkbox"/> Not applicable (did not eat <u>outside the home</u> )
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	8. Romaine lettuce?
				8a. Prepackaged or loose? <input type="checkbox"/> Prepackaged <input type="checkbox"/> Loose <input type="checkbox"/> Unknown
				8b. If eaten <u>at home</u> , what was the: Type, variety, brand: <input type="text"/> Place purchased from (names, locations): <input type="text"/> <input type="checkbox"/> Not applicable (did not eat <u>at home</u> )
				8c. If eaten <u>outside the home</u> , where? List name(s) and location(s): <input type="text"/> <input type="checkbox"/> Not applicable (did not eat <u>outside the home</u> )
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	9. Fresh spinach?
				9a. Prepackaged or loose? <input type="checkbox"/> Prepackaged <input type="checkbox"/> Loose <input type="checkbox"/> Unknown
				9b. If eaten <u>at home</u> , what was the: Type, variety, brand: <input type="text"/> Place purchased from (names, locations): <input type="text"/> <input type="checkbox"/> Not applicable (did not eat <u>at home</u> )
				9c. If eaten <u>outside the home</u> , where? List name(s) and location(s): <input type="text"/> <input type="checkbox"/> Not applicable (did not eat <u>outside the home</u> )
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10. Cabbage?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	11. Other leafy lettuce (red, butter, radicchio, "spring mix", "baby" salad greens, etc.?)

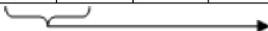
**Section 12 Tomato & Leafy Greens**  
**Comments.** Please fill in comments/notes from this section in the space provided

Now I have questions about herbs & sprouts you (your child) may have eaten in the 7 days before illness began. Remember, these could have been part of a dish such as pesto, salsa, sauces, etc. We are interested in fresh herbs, not dried or bottled herbs.

YES	Maybe	NO	Don't Know	Did you (your child) eat any:
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	12. Fresh Basil?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	13. Fresh cilantro?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	14. Other fresh herbs (parsley, sage, thyme, dill, etc.)?
				14a. What was the type, variety, brand: <input type="text"/> <input type="checkbox"/> Unknown
				15. Alfalfa sprouts?
				15a. If eaten <u>at home</u> , what was the: Type, variety, brand: <input type="text"/> Place purchased from (names, locations): <input type="text"/> <input type="checkbox"/> Not applicable (did not eat <u>at home</u> )
				15b. If eaten <u>outside the home</u> , where? List name(s) and location(s): <input type="text"/> <input type="checkbox"/> Not applicable (did not eat <u>outside the home</u> )
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	16. Other sprouts (bean, clover, broccoli, daikon radish, etc.)?
				16a. If eaten <u>at home</u> , what was the: Type, variety, brand: <input type="text"/> Place purchased from (names, locations): <input type="text"/> <input type="checkbox"/> Not applicable (did not eat <u>at home</u> )
				16b. If eaten <u>outside the home</u> , where? List name(s) and location(s): <input type="text"/> <input type="checkbox"/> Not applicable (did not eat <u>outside the home</u> )

**Section 12 Herbs & Sprouts**  
**Comments.** Please fill in comments/notes from this section in the space provided

Next I have a few questions about other fresh vegetables you (your child) may have eaten in the 7 days before your illness began.

YES	Maybe	NO	Don't Know	In the 7 days before the illness began, did you (your child) eat any:
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	17. Cucumbers, zucchini, squash?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	18. Bell peppers (green, red, orange, or yellow)?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	19. Hot chili/chile peppers (such as jalapenos or serranos)?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	20. Celery?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	21. "Mini" carrots? These are often peeled and sold in a sealed bag.
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	22. Other fresh carrots?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	23. Other raw root vegetables (radishes, beets, turnips, etc.)?
				23a. What was the type, variety, brand: <input type="text"/> <input type="radio"/> Unknown
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	24. Fresh, raw peas? May be shelled or in the pod
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	25. Broccoli?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	26. Cauliflower?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	27. Raw onions (white, yellow, or red/purple)?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	28. Raw green onions/scallions?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	29. Fresh or dried mushrooms?

**Section 12 Other Vegetable**  
**Comments.** Please fill in comments/notes from this section in the space provided

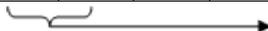
**Section 13: Frozen Foods:** Now I have a few questions about frozen foods you (your child) might have eaten in the 7 days before your (your child's) illness began. You (your child) could have eaten these either in your home or outside the home. As I read each food, please answer as yes, no, may have eaten, or can't remember eating the food in the 7 days before you (your child) got sick.

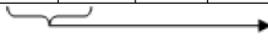
YES	Maybe	NO	Don't Know	Did you (your child) eat any:
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	1. Frozen vegetables (in bag or box)?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	2. Frozen pot pies?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	3. Frozen pizza?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	4. Frozen Mexican-style foods (burritos, etc.)?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	5. Frozen snack foods like mozzarella sticks, jalapeno poppers, potato skins, or hot pockets?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	6. Frozen breakfast items (waffles, breakfast sandwiches, etc.)?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	7. Frozen vegetarian foods such as a garden burger?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	8. Frozen pre-mixed meals in a bag or box (stir fry, pasta meals, etc.)?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	9. Frozen dinners or box entrees?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	10. Other frozen, prepackaged product not mentioned previously?
				10a. What was the type, variety, brand: <input type="text"/> <input type="radio"/> Unknown

**Section 13 Comments.** Please fill in comments/notes from this section in the space provided

**Section 14: Nuts, Cereal, Processed, and Dried Foods:** Now I have some questions about nuts, cereals, and processed foods you (your child) might have eaten in the 7 days before your (your child's) illness began. You (your child) could have eaten these either in your home or away from home. As I read each food, please answer as yes, no, may have eaten, or can't remember eating the food.

YES	Maybe	NO	Don't Know	Did you (your child) eat any:
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	1. Pre-packaged peanut butter crackers?
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	2. Any peanut butter?
				2a. If eaten <u>at home</u> , what was the brand, type/variety: Brand <input type="text"/> <input type="radio"/> Creamy <input type="radio"/> Crunchy <input type="radio"/> Unknown <input type="radio"/> Not applicable (did not eat <u>at home</u> )
				2b. If eaten <u>outside the home</u> , where? List name(s) and location(s): <input type="text"/> <input type="radio"/> Not applicable (did not eat <u>outside the home</u> )

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3. Peanut butter containing foods (cookies, candies, ice cream, etc.)?
				3a. What was the type, variety, brand: <input type="text"/> <input type="radio"/> Unknown
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4. Ground nut butter or spread other than peanut butter (Nutella, almond butter)?
<b>Next I have questions about nuts and seeds you (your child) might have eaten. Remember that these may be used as toppings or mixed into many foods. If you (your child) ate any of the nuts below as part of another food please answer "yes". Did you (your child) eat any of the following:</b>				
<b>YES</b>	Maybe	<b>NO</b>	Don't Know	Did you (your child) eat any:
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5. Peanuts?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	6. Almonds (whole, sliced, chopped, etc.)?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	7. Walnuts?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	8. Cashews?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	9. Pistachios?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10. Hazelnuts or filberts?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	11. Other whole nuts or mixed nuts?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	12. Sunflower seeds?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	13. Sesame seeds?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	14. Tahini, halva, or other product made from sesame seeds?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	15. Hummus?
<b>Section 14 Peanut butter/Nuts/Seeds Comments.</b> Please fill in comments/notes from this section in the space provided				<input type="text"/>
<b>Section 14 Peanut butter/Nuts/Seeds Comments.</b> Please fill in comments/notes from this section in the space provided				<input type="text"/>
<b>Now I have questions about pre-packaged snack foods and cereals you (your child) might have had in the 7 days before your (your child's) illness began.</b>				
<b>YES</b>	Maybe	<b>NO</b>	Don't Know	Did you (your child) eat any:
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	16. Granola bars, breakfast, power, or protein bars?
				16a. What was the type, variety, brand: <input type="text"/> <input type="radio"/> Unknown
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	17. Trail mix (or similar product)?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	18. Fruit roll-ups (or similar product)?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	19. Chips or pretzels?
				19a. What was the type, variety, brand: <input type="text"/> <input type="radio"/> Unknown
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	20. Pre-packaged crackers, cookies, or snack cakes?
				20a. What was the type, variety, brand: <input type="text"/> <input type="radio"/> Unknown
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	21. Chocolate or chocolate-containing candy?
				21a. What was the type, variety, brand: <input type="text"/> <input type="radio"/> Unknown
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	22. Cold breakfast cereal?
				22a. What was the type, variety, brand: <input type="text"/> <input type="radio"/> Unknown
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	23. Hot breakfast cereals like oatmeal, cream of wheat, etc.?
				23a. What was the type, variety, brand: <input type="text"/> <input type="radio"/> Unknown
<b>Section 14 Snack foods/Cereal Comments.</b> Please fill in comments/notes from this section in the space provided				<input type="text"/>
<b>And finally I have questions about dried, powdered products and supplements you (your child) might have had in the 7 days before your (your child's) illness began.</b>				
<b>YES</b>	Maybe	<b>NO</b>	Don't Know	Did you (your child) eat any:
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	24. Dried buttermilk?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	25. Flavored milk powder (such as chocolate or vanilla)?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	26. Other powdered milk products?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	27. Powdered nutritional supplement products?
<b>Section 14 Dried/Powdered foods Comments.</b> <i>Please fill in comments/notes from this section in the space provided</i>				
<b>Section 15: We have covered a wide variety of foods, drinks, etc. After answering all these questions are there any other things you (your child) ate or drank in the 7 days before becoming ill that have not been mentioned?</b>				
1. Please describe any other foods, drinks, etc. including as much detail as possible regarding type, variety, or brand.				
<b>Section 16: Animal contact and Pets:</b> Now I have some questions about contact with pets or other animals in the 7 days before your (your child's) illness began. This could have been at your home or another home, at a pet store, petting zoo, school, or other location.				
<b>YES</b>	<b>Maybe</b>	<b>NO</b>	<b>Don't Know</b>	<b>Did you (your child) visit or go to:</b>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1. A petting zoo or farm with livestock like cattle, sheep, goats, etc.?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2. Agricultural 'Farm and Feed' stores?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3. Pet stores, swap meets, other places where animals/birds were sold or shown?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4. County/State fairs, 4-H events, or similar event where animals were present?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5. School events, birthday parties, or similar events with animals/pets?
				<b>Did you (your child) have any contact with:</b>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	6. Dogs or puppies?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	7. Cats or kittens?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	8. Baby chicks, ducklings, or other baby poultry?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	9. Live chickens, turkeys, ducks or other adult poultry?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10. Turtles or tortoises?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	11. Snakes?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	12. <u>Frozen</u> mice, rats, or similar pet food for snakes?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	13. Other reptiles, such as lizards, geckos, etc.?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	14. Amphibians, such as frogs, toads, or salamanders?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	15. Water pets in an aquarium (goldfish, aquatic frogs, snails, etc.)?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	16. Rats, mice, gerbils, or hamsters?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	17. "Pocket" or "exotic" pets (ferrets, pygmy hedgehogs, rabbits, sugar gliders, guinea pigs, etc.)?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	18. Prepackaged pet food?
				18a. What was the type, variety, brand: <input type="text"/> <input type="radio"/> Unknown
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	19. Pet treats or chews (pig ears, pizzles, rawhide, hooves, etc.)?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	20. Dried animal droppings or pellets (e.g., owl pellets for science projects)?
<b>Section 16 Comments.</b> <i>Please fill in comments/notes from this section in the space provided</i>				



## Figure 2

Available online at: <http://www.cdc.gov/healthypets/resources/stay-healthy-working-farm-animals.pdf>.

### Stay Healthy When Working with Farm Animals: Follow these simple tips to help prevent illness when working with farm animals

Working with farm animals can be a rewarding and meaningful experience for children. Caring for and showing these animals are great ways for children to learn about agricultural sciences and personal responsibility. However many farm animals, including cattle, goats, sheep, swine, and poultry, can carry germs such as *Salmonella* or *E. coli* that can make people sick. Luckily, there are simple steps that you can take to help prevent illness.

#### How do people get sick from farm animals?

Animals can carry germs even when they appear healthy and clean. The germs are shed in animals' feces (poop) and can easily contaminate their bodies (fur or feathers) and anything in areas where these animals live and roam. People can become ill by touching farm animals or the areas where the animals live and roam.

#### Who is at most risk?

Anyone can get sick from farm animals, but some people are more likely to have a serious illness:

- Children younger than 5 years of age
- Adults 65 years of age or older
- Pregnant women
- People with some illnesses (like cancer) that weaken immune systems



#### Follow these simple tips to help prevent illness:

- Wash your hands thoroughly with soap and water right after touching farm animals or anything in the areas where they live and roam. Washing hands with soap and water is the best way to reduce the number of germs on them.
  - If soap and water are not available, use an alcohol-based hand sanitizer that contains at least 60% alcohol.
- Supervise children younger than 5 years of age if they handle or touch farm animals or animal areas and equipment. Young kids should avoid certain animals that are more likely to spread germs, including poultry, pre-weaned calves, young goats and sheep, and any ill animals.
- Keep your food and drinks away from farm animals and out of animal areas.
- Keep animals away from areas where food or drink is prepared, stored, or consumed, including kitchens and outdoor patios.
- Have a set of dedicated shoes or boots, gloves, coveralls, or other work clothes that you use just for working in animal areas. Remove them as soon as possible after leaving animal areas.
- Clean gloves and work clothes regularly.
- Clean and disinfect work shoes, boots, and equipment regularly.

To learn more, visit <http://www.cdc.gov/Features/AnimalExhibits/>



United States  
Department of  
Agriculture



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**Figure 3**

Available online at: <http://www.cdc.gov/healthypets/resources/salmonella-baby-poultry.pdf>.

## After you touch ducklings or chicks, wash your hands so you don't get sick!



- Contact with live poultry (chicks, chickens, ducklings, ducks, geese, and turkeys) can be a source of human *Salmonella* infections.
- Salmonella* germs can cause a diarrheal illness in people that can be mild, severe, or even life threatening.
- Chicks, ducklings, and other live poultry can carry *Salmonella* germs and still appear healthy and clean.
- Salmonella* germs are shed in their droppings and can easily contaminate their bodies and anything in areas where birds live and roam.

### Protect Yourself and Your Family from Germs

<p><b>DO:</b></p> <ul style="list-style-type: none"><li>Wash your hands thoroughly with soap and water right after touching live poultry or anything in the area where they live and roam.</li><li>Adults should supervise hand washing for young children.</li><li>If soap and water are not readily available, use hand sanitizer until you are able to wash your hands thoroughly with soap and water.</li><li>Clean any equipment or materials associated with raising or caring for live poultry outside the house, such as cages or feed or water containers.</li></ul>	<p><b>DON'T:</b></p> <ul style="list-style-type: none"><li>Don't let children younger than 5 years of age, elderly persons, or people with weak immune systems handle or touch chicks, ducklings, or other live poultry.</li><li>Don't let live poultry inside the house, in bathrooms, or especially in areas where food or drink is prepared, served, or stored, such as kitchens, or outdoor patios.</li><li>Don't snuggle or kiss the birds, touch your mouth, or eat or drink around live poultry.</li></ul>
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For more information, call 1-800-CDC-INFO or visit [www.cdc.gov](http://www.cdc.gov).



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Figure 4

Available online at: <http://www.cdc.gov/healthypets/resources/backyard-flock-8x11.pdf>.

# Have a backyard flock? Don't wing it.

**LEARN HOW TO**

**Safely clean coops.** 

**Handle birds safely.** 

**FIND OUT WHY**

**Poultry belong outside.** 

**Handwashing protects you from germs.** 

[cdc.gov/Features/SalmonellaPoultry/](http://cdc.gov/Features/SalmonellaPoultry/)



**U.S. Department of Health and Human Services**  
Centers for Disease Control and Prevention

Scan this QR code with your smartphone or tablet to visit [cdc.gov/Features/SalmonellaPoultry/](http://cdc.gov/Features/SalmonellaPoultry/)



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## Extension Worksheet 1

### Data Extension: Illness Onset Dates

Patient ID	Onset Date						
1	3/4/14	41	3/30/14	81	4/7/14	121	4/16/14
2	3/4/14	42	3/31/14	82	4/7/14	122	4/16/14
3	3/8/14	43	3/31/14	83	4/7/14	123	4/17/14
4	3/11/14	44	3/31/14	84	4/7/14	124	4/17/14
5	3/13/14	45	3/31/14	85	4/7/14	125	4/17/14
6	3/15/14	46	3/31/14	86	4/7/14	126	4/17/14
7	3/15/14	47	3/31/14	87	4/7/14	127	4/18/14
8	3/15/14	48	3/31/14	88	4/7/14	128	4/18/14
9	3/15/14	49	3/31/14	89	4/8/14	129	4/18/14
10	3/17/14	50	3/31/14	90	4/8/14	130	4/18/14
11	3/18/14	51	4/1/14	91	4/8/14	131	4/18/14
12	3/19/14	52	4/1/14	92	4/8/14	132	4/18/14
13	3/19/14	53	4/1/14	93	4/9/14	133	4/18/14
14	3/20/14	54	4/2/14	94	4/9/14	134	4/19/14
15	3/21/14	55	4/2/14	95	4/9/14	135	4/19/14
16	3/21/14	56	4/3/14	96	4/9/14	136	4/20/14
17	3/22/14	57	4/3/14	97	4/9/14	137	4/20/14
18	3/22/14	58	4/3/14	98	4/9/14	138	4/20/14
19	3/22/14	59	4/3/14	99	4/9/14	139	4/20/14
20	3/23/14	60	4/3/14	100	4/9/14	140	4/21/14
21	3/23/14	61	4/3/14	101	4/10/14	141	4/21/14
22	3/23/14	62	4/3/14	102	4/11/14	142	4/21/14
23	3/25/14	63	4/3/14	103	4/11/14	143	4/22/14
24	3/25/14	64	4/3/14	104	4/11/14	144	4/22/14
25	3/25/14	65	4/4/14	105	4/11/14	145	4/22/14
26	3/25/14	66	4/4/14	106	4/11/14	146	4/22/14
27	3/25/14	67	4/4/14	107	4/11/14	147	4/22/14
28	3/26/14	68	4/4/14	108	4/12/14	148	4/24/14
29	3/26/14	69	4/4/14	109	4/12/14	149	4/25/14
30	3/27/14	70	4/4/14	110	4/12/14	150	4/25/14
31	3/27/14	71	4/4/14	111	4/13/14	151	4/25/14
32	3/28/14	72	4/4/14	112	4/13/14	152	4/25/14
33	3/28/14	73	4/4/14	113	4/14/14	153	4/26/14
34	3/28/14	74	4/5/14	114	4/15/14	154	4/26/14
35	3/28/14	75	4/5/14	115	4/15/14	155	4/27/14
36	3/29/14	76	4/5/14	116	4/15/14	156	4/27/14
37	3/29/14	77	4/5/14	117	4/15/14	157	4/27/14
38	3/29/14	78	4/6/14	118	4/15/14	158	4/27/14
39	3/30/14	79	4/6/14	119	4/15/14	159	4/27/14
40	3/30/14	80	4/6/14	120	4/15/14	160	4/28/14

<b>Patient ID</b>	<b>Onset Date</b>	<b>Patient ID</b>	<b>Onset Date</b>	<b>Patient ID</b>	<b>Onset Date</b>
161	4/28/14	201	5/20/14	241	7/24/14
162	4/28/14	202	5/20/14	242	7/24/14
163	4/28/14	203	5/21/14	243	7/26/14
164	4/29/14	204	5/22/14	244	7/29/14
165	4/29/14	205	5/23/14	245	8/3/14
166	4/29/14	206	5/25/14	246	8/7/14
167	4/30/14	207	5/25/14	247	8/8/14
168	5/1/14	208	5/26/14	248	8/8/14
169	5/1/14	209	5/28/14	249	8/15/14
170	5/1/14	210	5/30/14	250	8/15/14
171	5/1/14	211	6/2/14	251	8/16/14
172	5/1/14	212	6/3/14	252	8/21/14
173	5/1/14	213	6/3/14	253	8/25/14
174	5/3/14	214	6/6/14	254	8/28/14
175	5/4/14	215	6/6/14	255	9/2/14
176	5/4/14	216	6/7/14	256	9/3/14
177	5/4/14	217	6/8/14	257	9/7/14
178	5/5/14	218	6/8/14	258	9/10/14
179	5/5/14	219	6/9/14	259	9/22/14
180	5/6/14	220	6/9/14	260	9/22/14
181	5/6/14	221	6/10/14	261	9/23/14
182	5/8/14	222	6/11/14	262	9/29/14
183	5/8/14	223	6/11/14	263	10/6/14
184	5/8/14	224	6/12/14		
185	5/8/14	225	6/13/14		
186	5/8/14	226	6/16/14		
187	5/9/14	227	6/18/14		
188	5/9/14	228	6/20/14		
189	5/9/14	229	6/21/14		
190	5/10/14	230	6/23/14		
191	5/12/14	231	6/24/14		
192	5/13/14	232	6/25/14		
193	5/15/14	233	6/26/14		
194	5/15/14	234	7/3/14		
195	5/15/14	235	7/15/14		
196	5/16/14	236	7/15/14		
197	5/16/14	237	7/21/14		
198	5/18/14	238	7/21/14		
199	5/19/14	239	7/22/14		
200	5/20/14	240	7/23/14		

## Extension Worksheet 2A

### Eppendorf Tube Labels

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Directions:** The sample #'s provided below correspond with the Eppendorf tube label samples. These samples were taken from the ill patients. Details about the date of the sample and location of the patient are provided below. Note: Sample dates and locations correspond to Extension Worksheet 1: Illness Onset Dates.

Sample # (Patient ID)	Onset of Illness Date	Location
001	02/05/2014	Georgia
002	02/05/2014	North Carolina
003	02/10/2014	Ohio
004	02/15/2014	North Carolina
005	03/15/2014	Ohio
006	03/20/2014	Kentucky
007	04/05/2014	Pennsylvania
008	04/05/2014	Nevada
009	04/15/2014	Florida
010	04/28/2014	North Carolina
011	05/05/2014	Oklahoma
012	05/13/2014	Virginia
013	06/23/2014	Washington
014	07/02/2014	New York
015	09/29/2014	Georgia



## Extension Worksheet 2B

### Testing Samples

Diagnosing salmonellosis requires testing a clinical specimen (such as stool or blood) from an infected person to distinguish it from other illnesses that can cause diarrhea, fever, and abdominal cramps. Once *Salmonella* is identified in the specimen, additional testing can be done to further characterize the *Salmonella*.

Today you will act as a laboratory technician, testing for the presence of *Salmonella* in culture samples from several patients who suddenly became ill with diarrhea, fever, and abdominal cramps. Triple sugar iron (TSI) agar is a gel-like medium where some bacteria like *Salmonella* can grow. Adding a sample from the cultures will determine the presence of *Salmonella* when the medium turns reddish on the top and yellow on the bottom.

#### Materials

- Pre-made TSI agar test-tube samples (15) in a test tube rack
- 15 cultured samples in Eppendorf tubes
- 15 cotton swabs
- Personal protective equipment: gloves, goggles, apron

#### Procedure

1. In pairs, gather materials and put appropriate personal protection equipment, including gloves, goggles, and an apron.
2. Label the TSI test tubes with sample #, date, and location.
3. Work with one sample at a time.
4. Carefully open 001 cultured sample in an Eppendorf tube and introduce a clean cotton swab into the cultured sample, twirl the cotton swab to collect a small sample.
5. Carefully open the corresponding TSI agar tube labelled 001 and place the cotton swab with sample in direct contact with the agar. Make sure to add the sample to the correct TSI test tube.
6. Repeat steps 4–5 for all 15 samples.
7. Wait 2–5 minutes and read the results. A positive result is indicated if the sample agar turns a reddish color, and a negative result is indicated if the agar does not change color.
8. Record data in the table.
9. Answer the discussion question using complete sentences.
10. Clean the laboratory area and safely dispose of materials as directed by your teacher.

**Results:** Use the table below to record the results.

**Table 1.** Cultured sample testing for *Salmonella* using Triple Sugar Iron (TSI) agar.

<b>Sample #</b>	<b>Date</b>	<b>Location</b>	<b>Triple sugar iron agar result</b>
001	02/05/2014	Georgia	
002	02/05/2014	North Carolina	
003	05/10/2014	Ohio	
004	04/15/2014	North Carolina	
005	03/15/2014	Ohio	
006	03/20/2014	Kentucky	
007	04/05/2014	Pennsylvania	
008	04/05/2014	Nevada	
009	04/15/2014	Florida	
010	04/28/2014	North Carolina	
011	05/05/2014	Oklahoma	
012	05/13/2014	Virginia	
013	06/23/2014	Washington	
014	07/02/2014	New York	
015	09/29/2014	Georgia	

**Discussion:** Looking at the data, describe 2-3 patterns that you observe. Answer using complete sentences.

## Extension Worksheet 2C

### Testing Samples, Guide

Diagnosing salmonellosis requires testing a clinical specimen (such as stool or blood) from an infected person to distinguish it from other illnesses that can cause diarrhea, fever, and abdominal cramps. Once *Salmonella* is identified in the specimen, additional testing can be done to further characterize the *Salmonella*.

Today you will act as a laboratory technician, testing for the presence of *Salmonella* in culture samples from several patients who suddenly became ill with diarrhea, fever, and abdominal cramps. Triple sugar iron (TSI) agar is a gel-like medium where some bacteria like *Salmonella* can grow. Adding a sample from the cultures will determine the presence of *Salmonella* when the medium turns reddish on the top and yellow on the bottom.

#### Materials

- Pre-made TSI agar test-tube samples (15) in a test tube rack
- 15 cultured samples in Eppendorf tubes
- 15 cotton swabs
- Personal protective equipment: gloves, goggles, apron

#### Procedure

11. In pairs, gather materials and put appropriate personal protection equipment, including gloves, goggles, and an apron.
12. Label the TSI test tubes with sample #, date, and location.
13. Work with one sample at a time.
14. Carefully open 001 cultured sample in an Eppendorf tube and introduce a clean cotton swab into the cultured sample, twirl the cotton swab to collect a small sample.
15. Carefully open the corresponding TSI agar tube labelled 001 and place the cotton swab with sample in direct contact with the agar. Make sure to add the sample to the correct TSI test tube.
16. Repeat steps 4–5 for all 15 samples.
17. Wait 2–5 minutes and read the results. A positive result is indicated if the sample agar turns a reddish color, and a negative result is indicated if the agar does not change color.
18. Record data in the table.
19. Answer the discussion question using complete sentences.
20. Clean the laboratory area and safely dispose of materials as directed by your teacher.

**Results:** Use the table below to record the results.

**Table 1.** Cultured sample testing for *Salmonella* using Triple Sugar Iron (TSI) agar.

Sample #	Date	Location	Triple sugar iron agar result (Answers)
001	02/05/2014	Georgia	+
002	02/05/2014	North Carolina	+
003	05/10/2014	Ohio	-
004	04/15/2014	North Carolina	-
005	03/15/2014	Ohio	+
006	03/20/2014	Kentucky	+
007	04/05/2014	Pennsylvania	+
008	04/05/2014	Nevada	-
009	04/15/2014	Florida	+
010	04/28/2014	North Carolina	+
011	05/05/2014	Oklahoma	-
012	05/13/2014	Virginia	+
013	06/23/2014	Washington	+
014	07/02/2014	New York	+
015	09/29/2014	Georgia	+

**Discussion:** Looking at the data, describe 2-3 patterns that you observe. Answer using complete sentences.

**Answer:** Responses will vary. See examples below.

- The majority of states affected are located in the northeast area of the country, however Washington tested positive too.
- On the basis of dates reported, the outbreak started February–October 2014.
- The majority of samples are from April and May.

The test shows positive or negative results only.