5 How are public health data visualized?

CDC NERD Academy

Grade level: 6–12

Suggested time: 75 minutes

Overview

In this module, students discover the important information data visualizations, such as epidemic (or epi) curves, convey about disease spread. Students will use surveillance data from a fictional, novel emerging respiratory disease (NERD) to create epi curves, identify patterns that reveal likely transmission modes, and make recommendations for prevention strategies to reduce the spread of disease.

Learning objectives

After this module, students should be able to

- Explain how data visualizations can be used to effectivel communicate public health data
- Create an epi curve using appropriate labels and scales f the x- and y-axes
- Describe the role of epi curves in identifying patterns in disease spread during an outbreak
- Identify four types of epi curve patterns: point source; continuous common source; intermittent common source and propagated
- Make inferences about outbreak scenarios by interpretin epi curve patterns

STEM connections & standards

STEM connections: Science: microbiology, pathogens; Math: graphing, interpreting patterns, analyzing data

Problem-based skills: Identifying trends, collaborative performance

Epidemiology and Public Health Science Core Competencies: HS-EPHS2: Public Health Surveillance **https://www.cdc.gov/careerpaths/k12teacherroadmap/pdfs/ephs-competencies.pdf**

National Health Education Standards: Standard 5: Students will demonstrate the ability to use decision-making skills to enhance health. **https://www.cdc.gov/healthyschools/sher/standards/index.htm**

Next Generation Science Standards: Science & Engineering Practice(s): Asking Questions and Defining Problems, Analyzing and Interpreting Data, Obtaining, Evaluating, and Communicating Information; Crosscutting Concept(s): Patterns **http://www.nextgenscience.org/get-to-know**

Timeline

1 Introducing the content (30 minutes)

Students watch the "How are public health data visualized?" video (12:08 minutes) to learn about public health epidemic (or epi) curves curves. Teachers can assess student knowledge of the video content using the **Knowledge Check**. The class can further discuss the role of a health communication specialist using the **Career Spotlight**.

2 Activity (35 minutes)

In this collaborative jigsaw activity, students serve as data experts and create epi curves using surveillance data. Then, they identify the pattern of each epi curve and the scenario it matches, including one representing a NERD outbreak. By interpreting the NERD epi curve, students identify patterns and brainstorm factors that may contribute to the spread of NERD and recommend prevention strategies to stop the spread. Teachers can watch an activity demonstration video (2:21 minutes) that illustrates how to teach this activity in the classroom.

3 Class discussion (10 minutes)

As a class, students apply their knowledge to answer questions about how public health data can be effectively visualized.

Vocabulary

Continuous common source outbreak, epidemic (epi) curve, flatten the curve, incubation period, intermittent common source outbreak, point source outbreak, propagated outbreak, x-axis, y-axis.

See **Definitions**.

Materials

Handouts, scissors, and graph paper or an online spreadsheet**.**

For students with a visual disability, incorporate a tactile element that allows them the opportunity to feel the graph directions. Consider push pins on a corkboard, using wax covered yarn, or gluing string on top of the graphs.

Meet Harper, a health communciation specialist

Learn more about a health communication specialist's role in the **Career Spotlight** and the "How are public health data visualized?" video.

Teacher preparation

- Preview videos.
- Make copies of handouts.
- Cut out the **Data Table Cards** and **Scenario Cards**.
- Make copies of the **NERD Factsheet** (one per group) or an enlarged classroom version.

> The **NERD Factsheet** is not required for this lesson but may be useful as a reference.

> The **NERD Factsheet** may be re-used across modules if previously distributed to students.

> For students with a visual disability, create tactile elements for **Knowledge Check: Epi Curves** and the **Visualizing Data** worksheet**.**

Videos

- "How are public health data visualized?" video (12:08 minutes) for students
- Activity demonstration video (2:21 minutes) for teachers

www.cdc.gov/scienceambassador/nerdacademy/data-interpretation.html

Handouts

- **Knowledge Check: Epi Curves** (one per student)
- **Career Spotlight: Health Communication Specialist** (one per student or classroom)
- **Data Table Cards** (one set per home group; cut into one card per student).

> Each student in the home group has a different card (data table). This will be the data set used to create an epi curve.

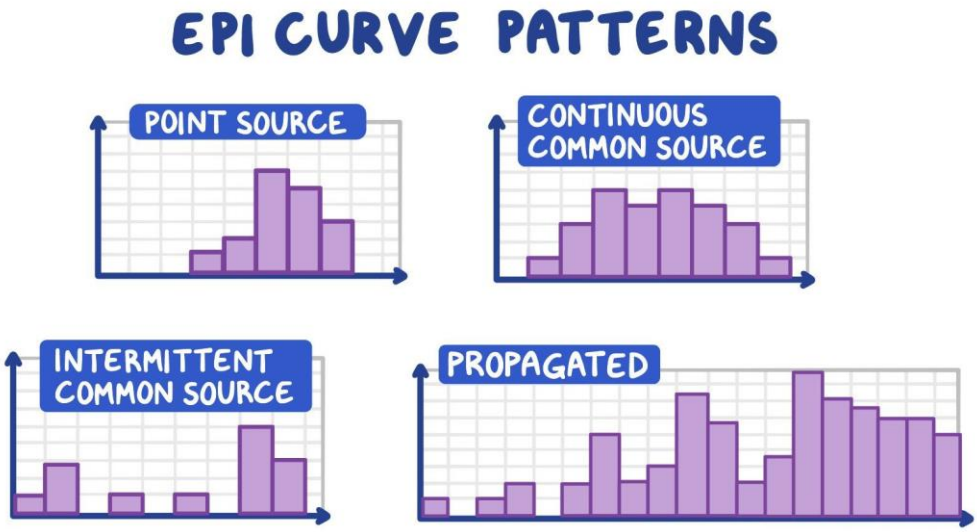
- **Visualizing Data** (one per student)
- **Scenario Cards** (one set per home group)

Introducing the content (30 minutes)

Say aloud

During the video, you will learn how public health experts such as epidemiologists and health communication specialists use data visuals to share public health data in a meaningful way. One commonly used data visualization is an epidemic, or epi, curve. It is a type of graph that shows the number of cases of disease over time. Epidemiologists use epi curves in outbreaks of all sizes to help them understand public health problems. For example, epi curves show a variety of patterns that can tell us how disease is spread. Epi curves can also give epidemiologists an idea of when an outbreak started, if prevention strategies have reduced the spread of disease, and if the disease has stopped spreading. This information can then be communicated to the public by health communication specialists.

1. Show the "How are public health data visualized?" video (12:08 minutes) to students.
2. Hand out the **Knowledge Check: Epi Curves**. Allow students 3–5 minutes to answer the questions on their own. Then, review as a class using the **Knowledge Check: Answer Key** provided.
3. Hand out or display the **Career Spotlight**. Discuss the role of a health communication specialist.



Activity (35 minutes)

Say aloud

Health communication specialists work to translate information collected by epidemiologists into messages and visuals that people can understand. Epi curves are a great way to provide a clear picture of the amount and extent of disease spread over a given period without overwhelming people with lists of numbers. During this jigsaw activity, you will work in two groups — a home group and a data expert group. Each person will serve as a data expert and will create an epi curve based on disease surveillance data. When you return to your home group, you will determine the pattern of each epi curve and identify which one of the epi curves and outbreak scenarios reflect the NERD outbreak.

1. Divide students into home groups of 4.
    a. Hand out **Data Table Cards**. Assign each group member one data table card on which to serve as a data expert. Each data table contains the data set students will use to create an epi curve.
    b. Hand out the **Visualizing Data** handout.

2. Have students move into data expert groups so that all students assigned Data Table A are working together, all students with Data Table B are working together, and so on.
    a. Instruct data experts in each group to work together to create an epi curve in the space provided in part 1 of the **Visualizing Data** handout using their assigned data set. Remind students that they should develop a title for their epi curve, label the x- and y-axes and use appropriate scales for their data.
    b. For part 2 of the **Visualizing Data** handout, instruct data expert groups to analyze their epi curve to identify the type of epi curve pattern: point source, continuous common source, intermittent common source, or propagated. Have students record the type of pattern and justification in the row corresponding to their assigned data set.

3. Have students return to their home groups.
    a. For part 3 of the **Visualizing Data** handout, have students share the epi curves, pattern types, and justification from their data expert groups. Instruct students to fill in the type of pattern and justification for the remaining three data sets in the table as other students share.
    b. For part 4 of the **Visualizing Data** handout, provide each home group with a set of **Scenario Cards**. Have students review the scenarios as a group. Instruct them to match each scenario with a data set and epi curve. Instruct students to record each matching scenario in the last column of the table.
    c. Instruct students to update their epi curve titles in part 1 of the **Visualizing Data** worksheet based on the matched scenario.
    d. For part 5 of the **Visualizing Data** handout, have student groups analyze the epi curve pattern which matches the NERD outbreak in Georgia and answer the remaining questions. Provide the optional **NERD Factsheet** to each group for additional reference.

Class discussion (10 minutes)

- In addition to a data table, why is it helpful to use data visualizations (e.g., an epi curve)?
- Describe the patterns you might see in an epi curve that represents a point source outbreak, an intermittent common source outbreak, a continuous common source outbreak, and a propagated outbreak.
- What other information can be displayed on an epi curve that may be helpful to epidemiologists, health communication specialists, other public health experts, and the public?

Definitions

Continuous common source outbreak: A type of common source outbreak where there is a single, common source of the agent, but exposure takes place over a longer period. As a result, cases are spread out over time.

Epidemic (epi) curve: A histogram that displays the number of new cases of disease over time.

Flatten the curve: Slowing transmission with the goal of decreasing the number of new cases to a level manageable for the existing healthcare system and aiming to lower the overall number of cases.

Incubation period: The time interval between when a person is exposed to an infectious agent and when they begin to develop symptoms.

Intermittent common source outbreak: A type of common source outbreak where there is a single, common source of the agent. However, the exposure is not continuous or steady, but intermittent, occurring at irregular intervals over time.

Point source outbreak: A type of outbreak where there is a single source of the agent and a narrow period of exposure.

Propagated outbreak: A type of outbreak where infection takes place through person-to-person spread.

X-axis: The horizontal axis of an epidemic curve, representing the period of time during which the new cases occurred.

Y-axis: The vertical axis of an epidemic curve, representing the number of new cases of the disease.

For more vocabulary, visit: **https://www.cdc.gov/scienceambassador/nerdacademy/glossary.html**.

Extension ideas

- Use the No Cure for the Summertime Blues lesson plan to work through a case study to create an epi curve and identify the type of epidemic pattern: **https://www.cdc.gov/careerpaths/scienceambassador/documents/hs-summertime-blues-2015.pdf**.
- Use the provided data visualization tools on the CDC COVID Data Tracker to compare epi curves: **https://covid.cdc.gov/covid-data-tracker/#compare-trends_newcases.** Students can compare data for up to six states, territories, or regions at a time, and choose a variety of display options (e.g., viewing cases versus deaths or raw totals versus rate per 100,000).
- Use the CDC COVID Data Tracker to find demographic data for your state or county: **https://covid.cdc.gov/covid-data-tracker/#datatracker-home**. Have students graph this data by age group, race/ethnicity, sex, or other demographic information.
- Compare trend lines of total COVID-19 cases among countries using **https://coronavirus.jhu.edu/data/new-cases**.

Resources

CDC Resources

Principles of Epidemiology in Public Health Practice, Lesson 1, Section 11: Epidemic Disease Occurrence: Epidemic Patterns
https://www.cdc.gov/csels/dsepd/ss1978/lesson1/section11.html

Quick-Learn Lesson: Create an Epi Curve
https://www.cdc.gov/training/QuickLearns/createepi

Community mitigation guidelines to prevent pandemic influenza — United States, 2017
https://stacks.cdc.gov/view/cdc/45220

The CDC NERD Academy curriculum was developed by the Centers for Disease Control and Prevention's (CDC's) Science Ambassador Fellowship (SAF) program. Support for the curriculum is made possible through a partnership between the CDC Foundation and CDC. Videos for the curriculum were developed and produced by Osmosis.

Disclaimer: NERD (novel emerging respiratory disease) is a fictional disease created for this curriculum. NERD etiology, data, events, and information presented in the CDC NERD Academy curriculum are loosely based on the understanding of COVID-19 as of early Spring 2021 prior to a vaccine becoming available. Some details have been generalized for educational purposes.

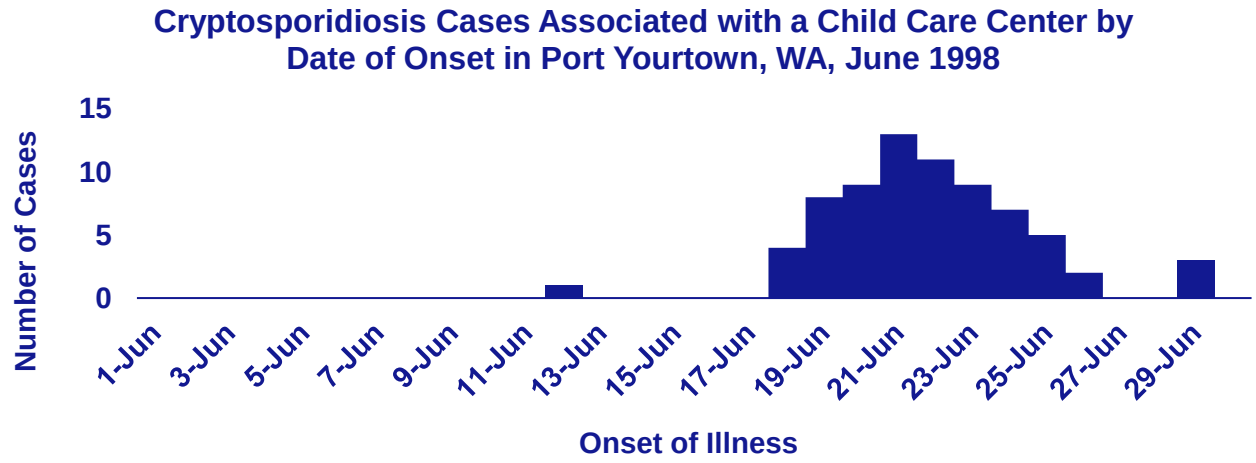
Knowledge Check: Epi Curves

Directions: "How are public health data visualized?" video (12:08 minutes)

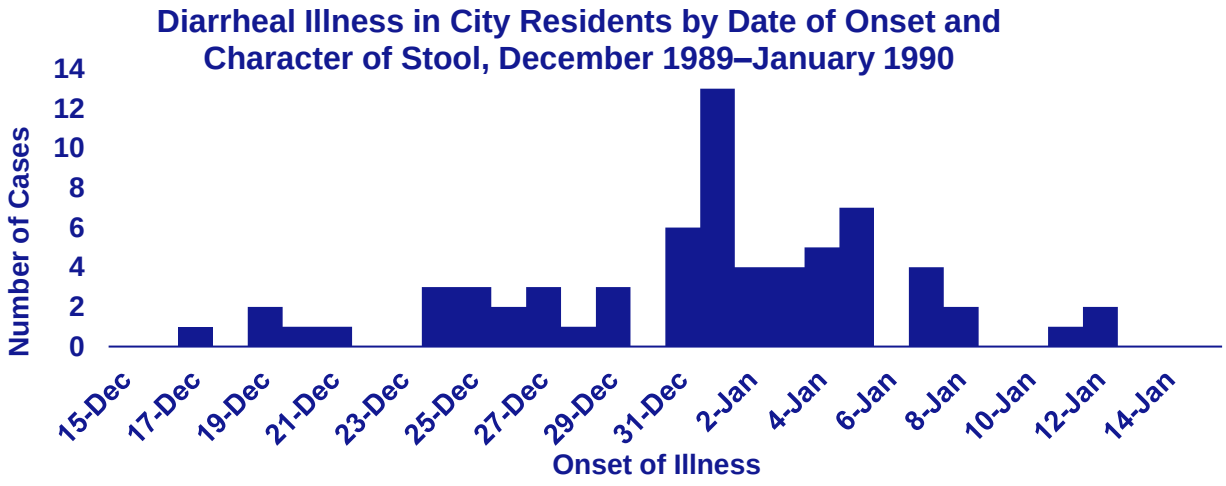
For questions 1–4, match the epi curves with the epi curve pattern type:

Continuous Common Source	Intermittent Common Source	Point Source	Propagated

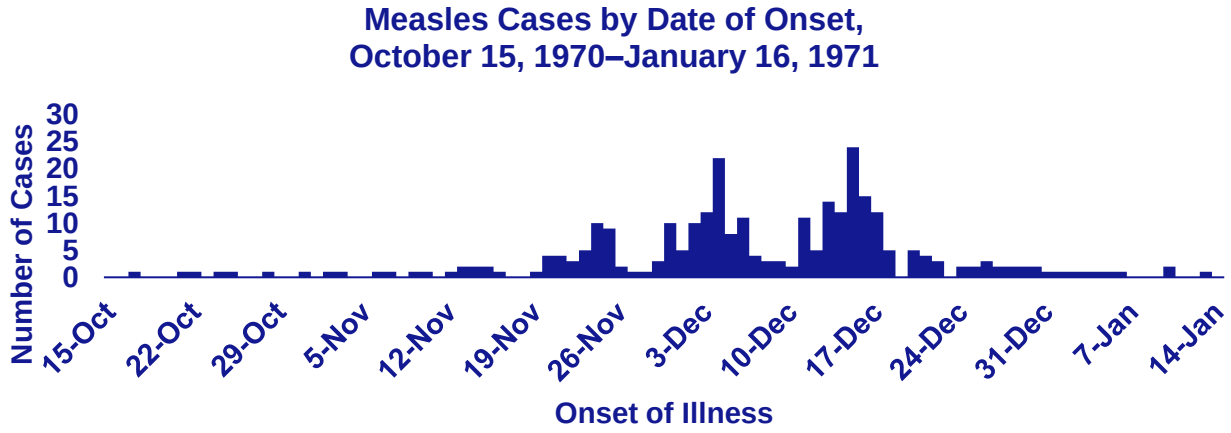
1 Match the epi curve with the epi curve pattern type.



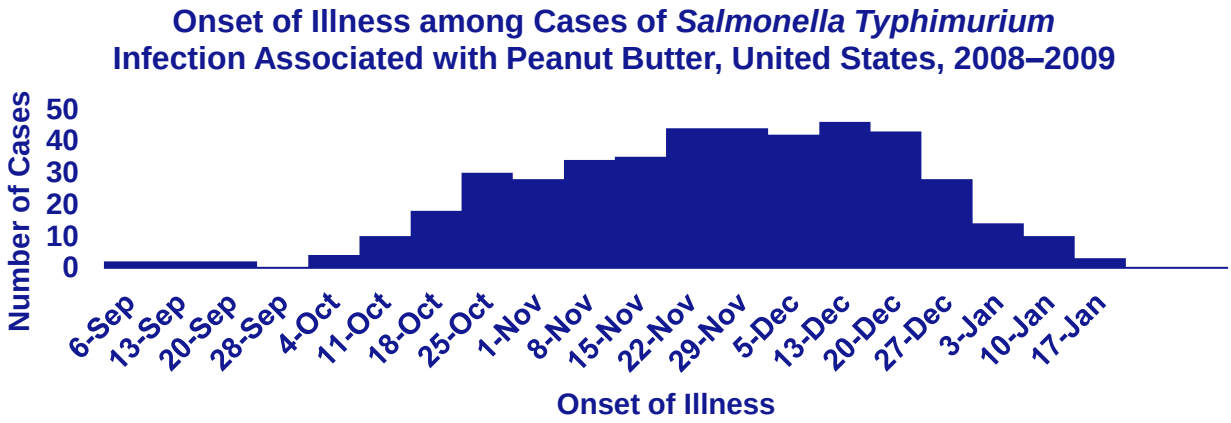
2 Match the epi curve with the epi curve pattern type.



3 Match the epi curve with the epi curve pattern type.



4 Match the epi curve with the epi curve pattern type.



5 What goes on the x-axis of an epi curve? The y-axis?

6 What do epi curves show? Why is this helpful to public health experts?

Knowledge Check: Answer Key

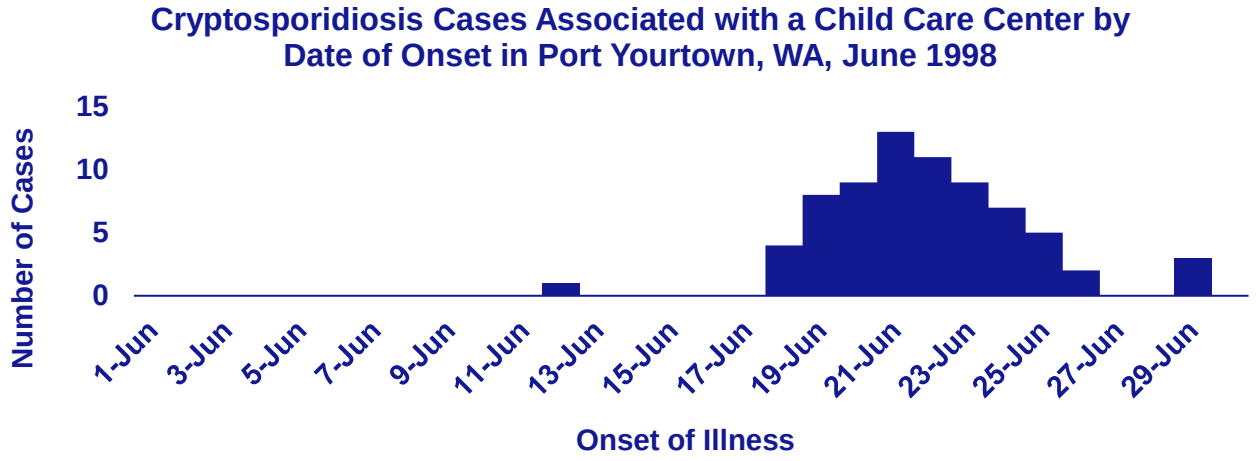
Directions: "How are public health data visualized?" video (12:08 minutes)

For questions 1–4, match the epi curves with the epi curve pattern type:

Continuous Common Source	Intermittent Common Source	Point Source	Propagated

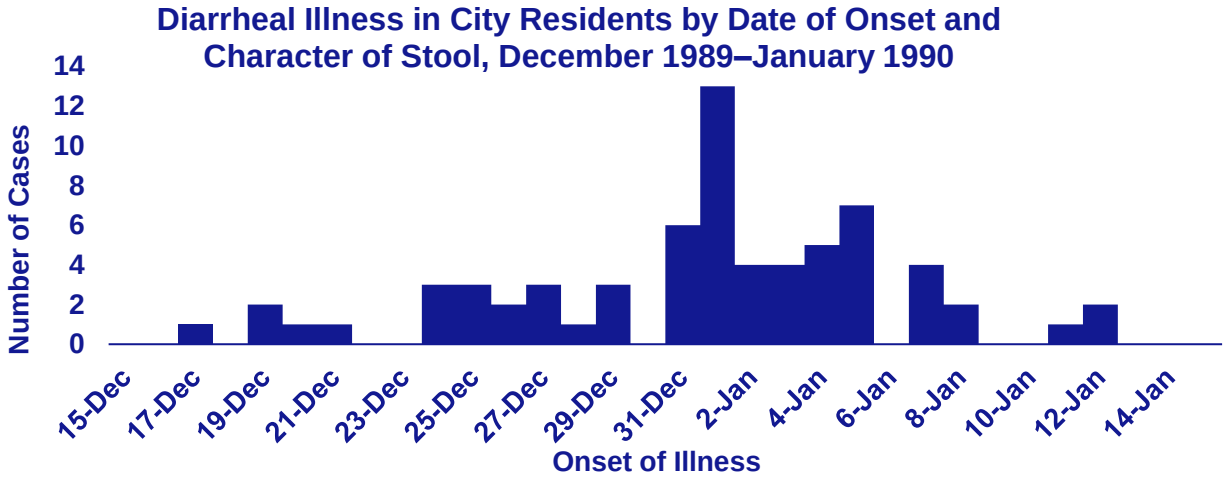
1 Match the epi curve with the epi curve pattern type.

Point Source



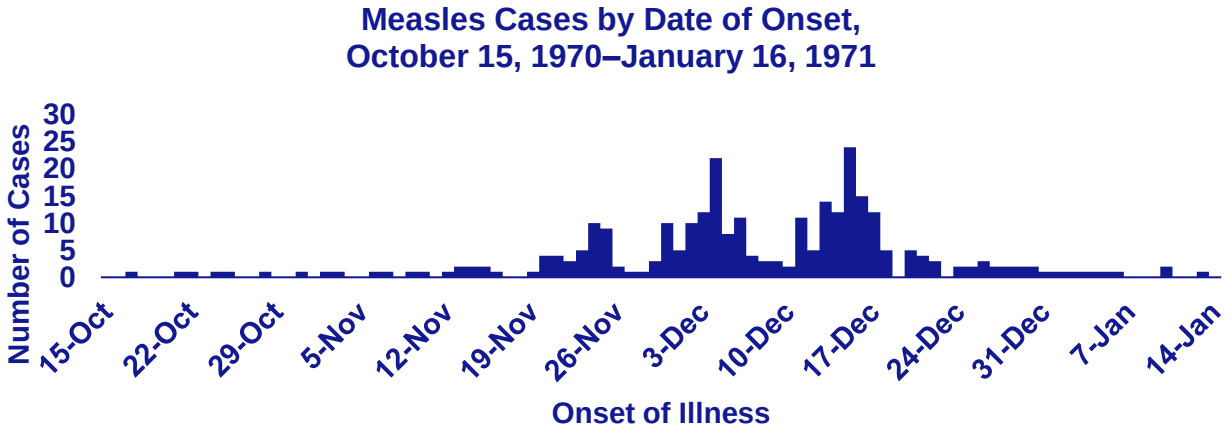
2 Match the epi curve with the epi curve pattern type.

Intermittent Common Source



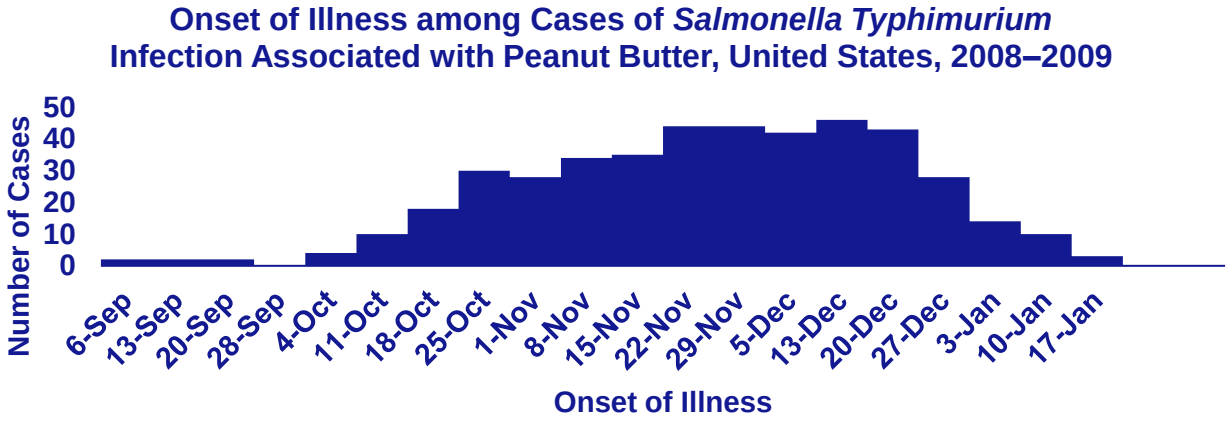
3 Match the epi curve with the epi curve pattern type.

Propagated



4 Match the epi curve with the epi curve pattern type.

Continuous
Common Source



5 What goes on the x-axis of an epi curve? The y-axis?

Answer: The x-axis always shows time — this may be in hours, days, weeks, months, or years. The y-axis always shows the number of cases. The scale of the y-axis can change, depending on total number of cases.

6 What do epi curves show? Why is this helpful to public health experts?

Answer: Epi curves can be used to visualize distribution of cases over time (i.e., when cases occurred), outbreak magnitude (i.e., how many cases over time), and outliers (i.e., cases that don't fit the pattern). The pattern visualized by the epi curve can help epidemiologists and other public health experts identify the outbreak source (i.e., how someone is exposed to an infectious agent) and how an infectious agent is spread.

Career Spotlight

CDC NERD Academy

Health Communication Specialist

A health communication specialist creates communication strategies, messages, and products to educate the public, news media, and other audience segments on health issues. During an outbreak response, they develop messages and visuals that communicate culturally relevant, timely and actionable information.

**Meet Harper,
a health communication specialist**

Who do they work with?

Health communication specialists often work with epidemiologists, scientists, policy makers, and other public health experts to translate scientific health information. They work with graphic designers, usability experts, and web developers to create easy-to-understand information. They engage audience influencers, local, state, and federal partners for input and help sharing information through traditional channels (e.g., newspapers, TV) and digital channels (e.g., social media) to best reach those affected.

Where do they work?

Health communication specialists working in public health may work at government agencies, nonprofit organizations, schools, and hospitals. They also work with news media outlets, representatives of the electronic and print media, and web and social media developers.

What skills do they use?

Health communication specialists must be able to communicate clearly and succinctly and translate complex scientific concepts into easy-to-follow information and recommendations. They use skills in project management and must be willing to work in diverse environments and collaborate with different experts. They must also strive for cultural competency (e.g., understanding how a person's background can affect their health and health behaviors).

What qualifications do they need?

Health communication specialists often have a bachelor's or master's degree in communications, journalism, public relations, or a related communication field.

NERD Factsheet

CDC NERD Academy

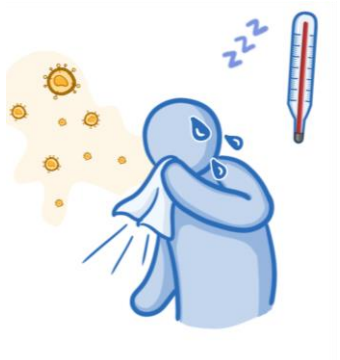
NOVEL EMERGING RESPIRATORY DISEASE

What is NERD?

NERD is a fictional novel emerging respiratory disease caused by a virus that can spread from person to person. NERD symptoms can range from mild (or no symptoms) to severe illness and death.

Who can get NERD?

- People of any age can get NERD, even healthy young adults and children.
- People who are older or have certain underlying medical conditions are at higher risk of getting very sick from NERD.
- Other groups may be at higher risk for getting NERD or having more severe illness.



What are the symptoms of NERD?

Symptoms may appear 2–14 days after exposure to the virus. People with these symptoms may have NERD:

- Fever or chills
- Cough
- Shortness of breath or difficulty breathing
- Fatigue
- Muscle or body aches
- Headache
- New loss of taste or smell
- Sore throat
- Congestion or runny nose
- Nausea or vomiting
- Diarrhea

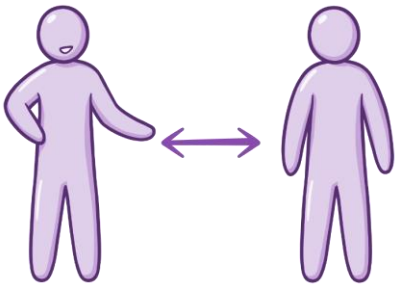
What do I do if I have symptoms?

- Stay home except to seek medical care. Separate yourself from other people.
- Get tested. If you test positive, tell your close contacts that they may have been exposed to NERD.
- You can be with others after at least 10 days since your symptoms first appeared and at least 24 hours with no fever.

Be aware of the signs of severe disease, including trouble breathing, pain or pressure in the chest, confusion, or trouble waking or staying awake. If someone is showing any of these signs, seek emergency medical care immediately.

How does NERD spread?

NERD **most commonly** spreads during direct, close contact:



- When people have direct contact with a person with NERD.
- When a person with NERD releases respiratory droplets when they cough, sneeze, sing, talk, or breathe, and these droplets are inhaled by another person who is physically near (within 6 feet).

NERD **sometimes** spreads through airborne transmission, especially indoors:

- When a person with NERD breathes heavily — such as when exercising, singing, or shouting — they can produce more respiratory droplets that can linger in the air for minutes to hours.

NERD is **less commonly** spread through contact with contaminated surfaces.

- When a person touches a surface or object with the virus on it and then touches their mouth, nose, or eyes.

What if I have been in close contact with someone with NERD?

Close contact is defined as being within 6 feet of a NERD-positive individual for a total of 15 minutes or more.

- Separate yourself from other people. A person infected with NERD can spread the virus starting 48 hours, or 2 days, before the person feels any symptoms or tests positive.
- Watch for symptoms until 14 days after exposure.
- If you do not have symptoms, you can be with others 14 days after your last contact with someone with NERD.
- If you have symptoms, you can be with others after at least 10 days since your symptoms first appeared and at least 24 hours with no fever.
- Get tested. If you test positive and have no symptoms, you can be with others after 10 days have passed since the date you had your positive test.

Three important ways to slow the spread

1. Wear a mask to protect yourself and others and stop the spread of NERD.
2. Stay at least 6 feet (about 2 arm lengths) from others who don't live with you.
3. Avoid crowds. The more people you are in contact with, the more likely you are to be exposed to NERD.

Data Table Cards

Data Table A

Date of onset	# of cases
Jan–Apr 2010	1
May–Aug 2010	0
Sep–Dec 2010	0
Jan–Apr 2011	2
May–Aug 2011	0
Sep–Dec 2011	0
Jan–Apr 2012	1
May–Aug 2012	0
Sep–Dec 2012	0
Jan–Apr 2013	0
May–Aug 2013	0
Sep–Dec 2013	1
Jan–Apr 2014	2
May–Aug 2014	0
Sep–Dec 2014	2
Jan–Apr 2015	1

Data Table B

Date of onset	# of cases
3/21 (March Week 3)	0
3/28 (March Week 4)	0
4/4 (April Week 1)	3
4/11 (April Week 2)	3
4/18 (April Week 3)	4
4/26 (April Week 4)	5
5/2 (May Week 1)	5
5/9 (May Week 2)	5
5/16 (May Week 3)	3
5/23 (May Week 4)	2
5/30 (May Week 5)	3
6/6 (June Week 1)	4
6/13 (June Week 2)	2
6/20 (June Week 3)	0
6/27 (June Week 4)	0

Data Table C

Date and time of onset	# of cases
6/30: 3:00 p.m.–5:59 p.m.	0
6/30: 6:00 p.m.–8:59 p.m.	1
6/30: 9:00 p.m.–11:59 p.m.	0
7/1: 12:00 a.m.–2:59 am	1
7/1: 3:00 a.m.–5:59 a.m.	1
7/1: 6:00 a.m.–8:59 a.m.	5
7/1: 9:00 a.m.–11:59 a.m.	9
7/1: 12:00 p.m.–2:59 p.m.	7
7/1: 3:00 p.m.–5:59 p.m.	2
7/1: 6:00 p.m.–8:59 p.m.	3
7/1: 9:00 p.m.–11:59 p.m.	2
7/2: 12:00 a.m.–2:59 a.m.	0
7/2: 3:00 a.m.–5:59 a.m.	0
7/2: 6:00 a.m.–8:59 a.m.	2
7/2: 9:00 a.m.–11:59 a.m.	2
7/2: 12:00 p.m.–2:59 p.m.	0

Data Table D

Date of onset	# of cases
12/24	7,876
12/25	5,125
12/26	3,673
12/27	2,960
12/28	3,161
12/29	5,914
12/30	5,466
12/31	8,526
1/1	8,756
1/2	6,600
1/3	5,077
1/4	4,045
1/5	6,133
1/6	5,640
1/7	7,098
1/8	10,380

Scenario A: Salmonellosis

Scenario
An outbreak of salmonellosis in several states led experts to discover the source of the outbreak to be a particular brand of single-serve frozen dinner with cheesy chicken and rice.

Salmonellosis has an incubation period of 12–72 hours. The contaminated frozen dinners were made in one batch and there was continual exposure as long as that batch was being consumed (e.g., as long as that batch was in people's freezers, there was the risk of consumption and infection). Illness onset took place over many incubation periods.

Place
Multiple states across the United States

Disease
Salmonellosis, caused by *Salmonella* bacteria

Signs and symptoms
Diarrhea, fever, and stomach cramps

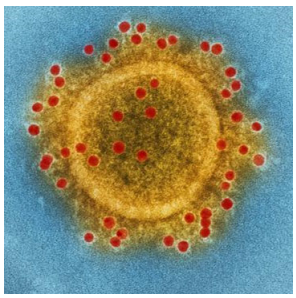
Scenario B: NERD

Scenario
A novel virus causing NERD is quickly spreading throughout the United States. Surveillance data were collected in each state so spread of infection could be tracked. Data for the state of Georgia shows how transmission increased dramatically during a three-week period. The incubation period is usually 2–14 days.

Place
Georgia, United States

Disease
NERD, caused by the NERD virus

Signs and symptoms
Fever, cough, and shortness of breath



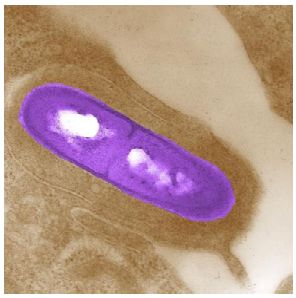
Scenario C: Listeriosis

Scenario
An outbreak of *Listeria* bacterial infections was investigated in the United States. Health officials found people from several different states were sick. Eventually, health officials were able to identify the source: a contaminated piece of equipment at an ice cream production facility. Because these frozen treats were made in different batches and were eaten at different times, sometimes months would pass before another person was infected.

Place
Multiple states across the United States

Disease
Listeriosis, caused by *Listeria* bacteria

Signs and symptoms
Headache, fever, and diarrhea. Pregnant women, adults aged ≥65 years, and people with weakened immune systems are at risk



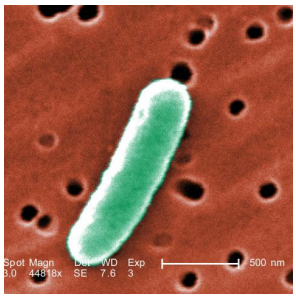
Scenario D: *E. coli*

Scenario
An outbreak of *E. coli* at a potluck party in North Carolina led to hospitalizations for severe gastrointestinal illness. A variety of foods were served but those who reported they ate chicken curry had a higher chance of getting sick than those who did not. The incubation period for *E. coli* is usually 3 or 4 days but can be as short as 1 day.

Place
North Carolina, United States

Disease
Escherichia coli disease, caused by *E. coli* bacteria

Signs and symptoms
Severe stomach cramps, bloody diarrhea, and vomiting



Part 1 (Data expert group)

Creating an epi curve

Directions: In your data expert group, each of you will create an epi curve using your group's assigned data set. Use the space below to draw your epi curve.

Data Table ____

Part 2 (Data expert group)

Analyzing the epi curve patterns

Directions: In your data expert group, analyze the epi curve created from the data table assigned to your group. Identify the type of epi curve pattern and justify your answer. Record the type of pattern and justification in the row corresponding to your assigned data set in the table below.

Part 3 (Home group)

Sharing expertise

Directions: In your home group, review the four data sets and fill in the first two columns (i.e., Type of pattern, How did you know?) of all rows in the table below.

Part 4 (Home group)

Scenarios

Directions: In your home group, review the four scenario cards. Match each data set and epi curve to one of the scenarios. Fill in the last column (i.e., Scenario) of the table below.

Table

Data set	Type of pattern	Justify your answer (How did you know?)	Scenario
A			
B			
C			
D			

Part 5 (Home group)

NERD outbreak in Georgia discussion questions

Directions: Your home group should now focus on the epi curve pattern which matches the NERD outbreak in Georgia. Work in your home groups to answer the following questions about NERD.

1. How did you know which data set and epi curve matched the NERD scenario?

2. What conclusions can you make about the spread of NERD during the period of the epi curve?

3. Consider the date of onset on the y-axis on the NERD epi curve. Provide an explanation for why NERD may be spreading during the specific time period.

4. How would you use the NERD epi curve to communicate information to the public?

5. Based on the NERD epi curve and the **NERD Factsheet**, what prevention strategies would you recommend that could help reduce the spread of NERD in Georgia?

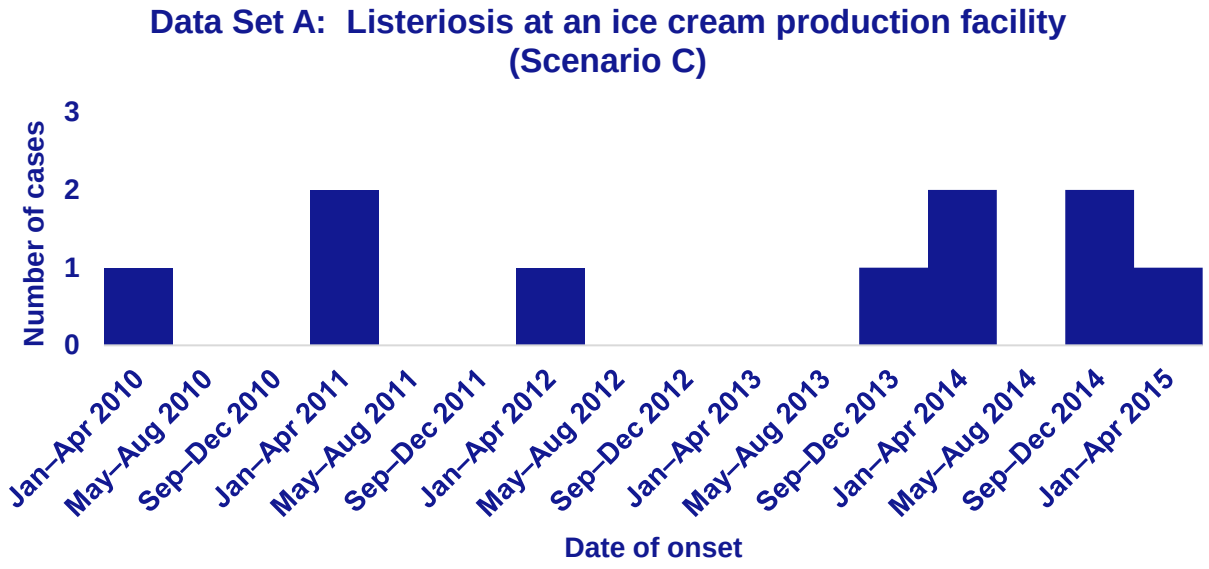
Part I (Data expert group)

Creating an epi curve

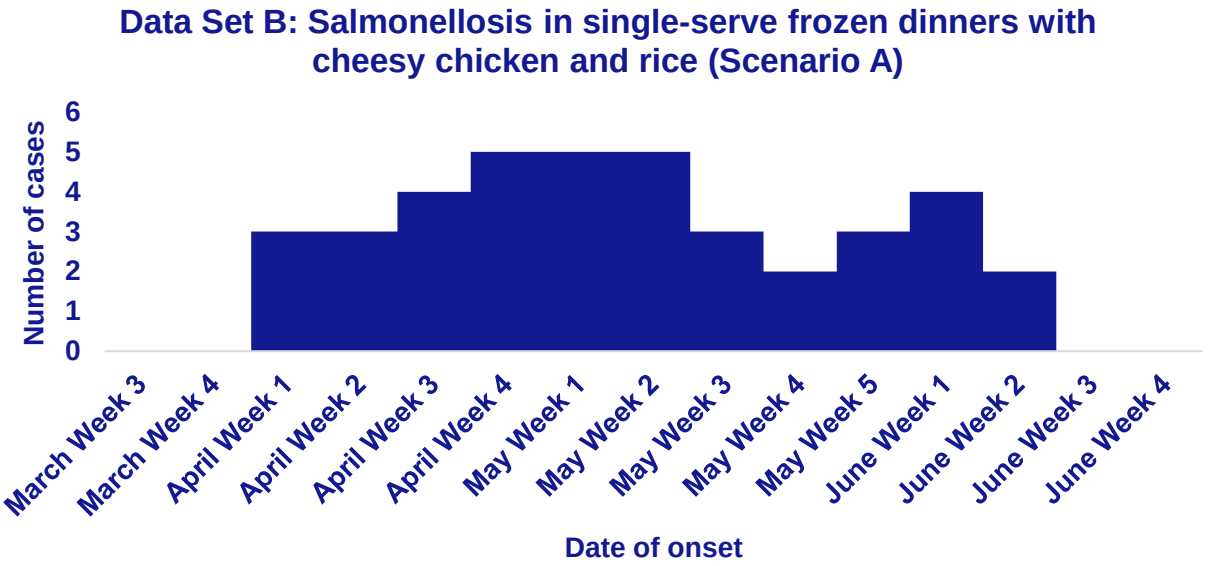
Directions: In your data expert group, each of you will create an epi curve using your group's assigned data set. Use the space below to draw your epi curve.

Data Table ____

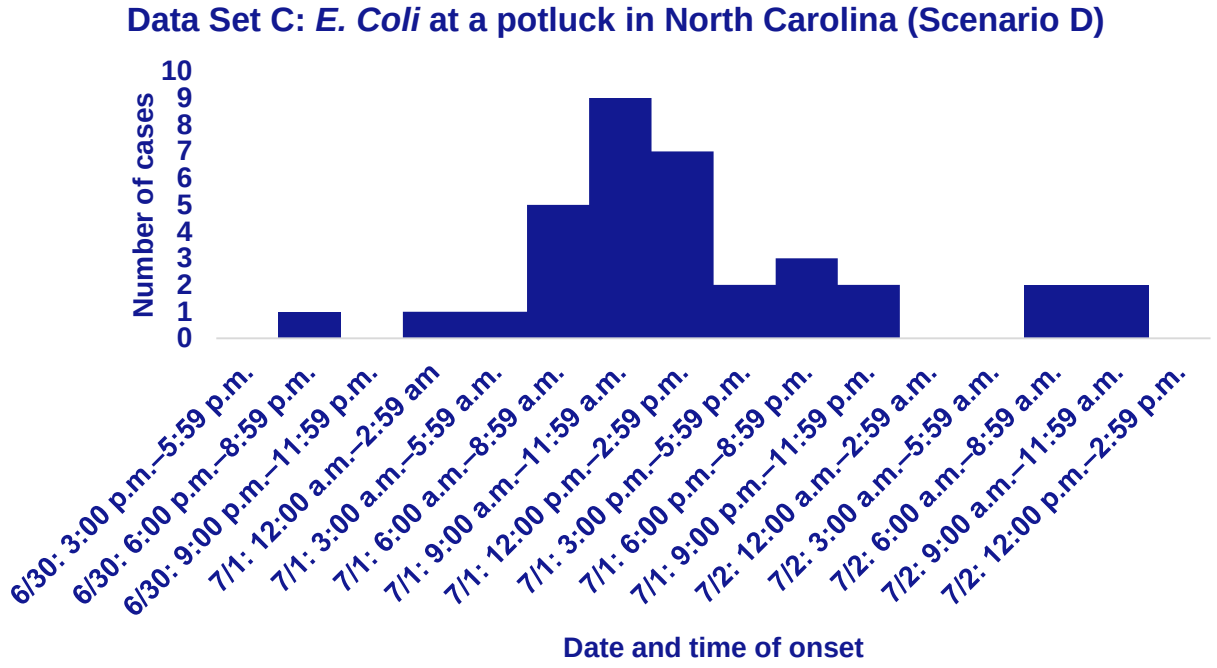
A



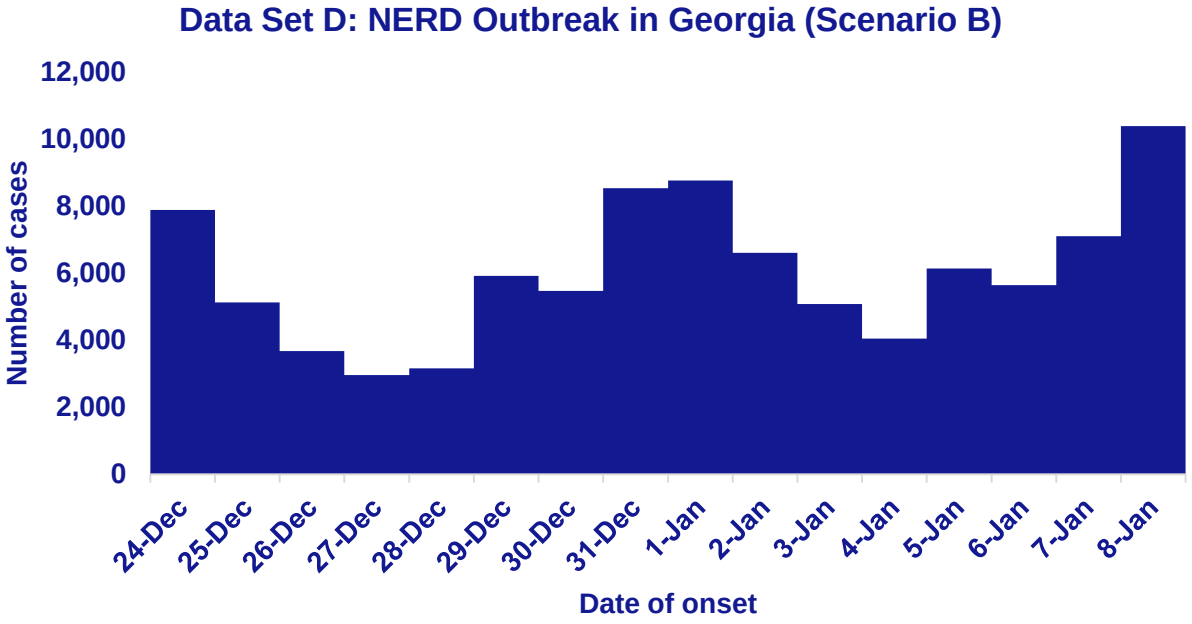
B



C


Data Set C: E. Coli at a potluck in North Carolina (Scenario D)
Number of cases
0
1
2
3
4
5
6
7
8
9
10
6/30: 3:00 p.m.–5:59 p.m.
6/30: 6:00 p.m.–8:59 p.m.
6/30: 9:00 p.m.–11:59 p.m.
7/1: 12:00 a.m.–2:59 am
7/1: 3:00 a.m.–5:59 a.m.
7/1: 6:00 a.m.–8:59 a.m.
7/1: 9:00 a.m.–11:59 a.m.
7/1: 12:00 p.m.–2:59 p.m.
7/1: 3:00 p.m.–5:59 p.m.
7/1: 6:00 p.m.–8:59 p.m.
7/1: 9:00 p.m.–11:59 p.m.
7/2: 12:00 a.m.–2:59 a.m.
7/2: 3:00 a.m.–5:59 a.m.
7/2: 6:00 a.m.–8:59 a.m.
7/2: 9:00 a.m.–11:59 a.m.
7/2: 12:00 p.m.–2:59 p.m.
Date and time of onset

D


Data Set D: NERD Outbreak in Georgia (Scenario B)
Number of cases
0
2,000
4,000
6,000
8,000
10,000
12,000
24-Dec
25-Dec
26-Dec
27-Dec
28-Dec
29-Dec
30-Dec
31-Dec
1-Jan
2-Jan
3-Jan
4-Jan
5-Jan
6-Jan
7-Jan
8-Jan
Date of onset

Part 2 (Data expert group)

Analyzing the epi curve patterns

Directions: In your data expert group, analyze the epi curve created from the data table assigned to your group. Identify the type of epi curve pattern and justify your answer. Record the type of pattern and justification in the row corresponding to your assigned data set in the table below.

Part 3 (Home group)

Sharing expertise

Directions: In your home group, review the four data sets and fill in the first two columns (i.e., Type of pattern, How did you know?) of all rows in the table below.

Part 4 (Home group)

Scenarios

Directions: In your home group, review the four scenario cards. Match each data set and epi curve to one of the scenarios. Fill in the last column (i.e., Scenario) of the table below.

Data set	Type of pattern	Justify your answer (How did you know?)	Scenario
A	**Intermittent Common Source**	**The epi curve shows breaks over several years in which no new cases are reported.**	**Scenario C: Listeriosis at an ice cream production facility**
B	**Continuous Common Source**	**The epi curve shows a period of weeks where case numbers do not significantly fluctuate over a period.**	**Scenario A: Salmonellosis in single-serve frozen dinners with cheesy chicken and rice**
C	**Point Source**	**The epi curve shows one peak in the middle with cases increasing before the peak and decreasing to zero after the peak, and the onset of illness occurred in hours. This indicates one source may have infected everyone at the same time.**	**Scenario D: *E. coli* at a potluck in North Carolina**
D	**Propagated**	**The epi curve shows numerous cases in increasing peaks over concurrent days, suggesting person-to-person transmission.**	**Scenario B: NERD outbreak in Georgia**

Part 5 (Home group)

NERD outbreak in Georgia discussion questions

Directions: Your home group should now focus on the epi curve pattern which matches the NERD outbreak in Georgia. Work in your home groups to answer the following questions about NERD.

1 How did you know which data set and epi curve matched the NERD scenario?

Answer: NERD is transmitted person to person. So, the epi curve pattern for NERD should be propagated. Because the epi curve for data set D shows a propagated pattern, this data set matches the outbreak of NERD in Georgia (Scenario B).

2 What conclusions can you make about the spread of NERD during the period of the epi curve?

Answer: The epi curve pattern for NERD in Georgia (Scenario B, Data Set D) shows a high number of cases with successive increasing peaks. This suggests person-to-person spread and that there is high community transmission with each person likely transmitting the NERD virus to more than one other person.

3 Consider the date of onset on the y-axis on the NERD epi curve. Provide an explanation for why NERD may be spreading during the specific period.

Answer: Answers will vary. Students may identify the potential effect of the holiday season in mid-December, including an increase of gatherings between groups of people and of people staying inside because of the colder weather.

4 How would you use the NERD epi curve to communicate information to the public?

Answer: Answers will vary. Students may include how an epi curve can be used to share information to the public through the health department's website, TV and radio stations, and on social media channels.

5 Based on the NERD epi curve and the NERD Factsheet, what prevention strategies would you recommend that could help reduce the spread of NERD in Georgia?

Answer: Answers will vary. Students may include a range of person-based actions (e.g., wearing a mask that covers your nose and mouth, staying 6 feet away from others, washing your hands often, avoiding crowds and poorly ventilated spaces, covering coughs and sneezes, cleaning and disinfecting surfaces, vaccination if/when available) to government-based policy (e.g., mask mandates, restaurant or business closures, cleaning and disinfecting protocols, limiting gatherings of people to fewer than 10). Students may suggest "layering" or using multiple prevention strategies at the same time reduce the spread of disease.