

# What exactly is a pandemic?



CDC NERD Academy



Grade level

6–12



Suggested time

75 minutes

## Overview

In this module, students are introduced to public health and how public health workers protect and improve the health of communities. They analyze characteristics of specific disease events to determine the level of disease occurrence (e.g., endemic, outbreak, epidemic, or pandemic). Using information on a fictional, novel emerging respiratory disease (NERD), students will track disease progression over time.

## Learning objectives

After this module, students should be able to

- Describe the purpose of public health and provide examples of public health actions
- Compare and contrast the roles of a healthcare provider and epidemiologist in improving health
- Evaluate patterns of disease occurrence to differentiate among endemic, outbreak, epidemic, and pandemic levels of disease occurrence
- Describe the circumstances when a virus would be considered a novel virus and describe its role in emerging pandemics
- Track events over time and location to determine when NERD becomes a pandemic



## STEM connections & standards

**STEM connections:** Science: classification; Social studies: timeline, mapping

**Problem-based skills:** Identifying trends, decision making, collaborative performance

**Epidemiology and Public Health Science Core Competencies:** HS-EPHS1: Epidemiologic Thinking and a Public Health Approach; HS-EPHS2: Public Health Surveillance  
<https://www.cdc.gov/careerpaths/k12teacherroadmap/pdfs/ephs-competencies.pdf>

**National Health Education Standards:** Standard 1: Students will comprehend concepts related to health promotion and disease prevention to enhance health. 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; Engaging in Argument from Evidence; Crosscutting Concept(s): Patterns <http://www.nextgenscience.org/get-to-know>

**N**OVEL  
**E**MERGING  
**R**ESPIRATORY  
**D**ISEASE





### 1 Introducing the content (30 minutes)

Students watch the “What exactly is a pandemic?” video (12:39 minutes) to learn about public health, pandemics, and other levels of disease occurrence. Teachers can assess student knowledge of the video content using the **Knowledge Check**. The class can further discuss the role of an epidemiologist using the **Career Spotlight**.

### 2 Activity (35 minutes)

In groups, students analyze data from health-related events to determine levels of disease occurrence. Then, they track NERD cases to justify when to declare a pandemic. Teachers can watch an activity demonstration video (2:48 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 pandemics.



#### Vocabulary

---

Case, cluster, endemic, epidemic, epidemiology, expected level, novel virus, outbreak, pandemic, public health.

See **Definitions**.



#### Materials

---

Handouts, scissors, and tape.



#### Meet Ezra, an epidemiologist

---

Learn more about an epidemiologist’s role in the **Career Spotlight** and the “What exactly is a pandemic?” video.



## Teacher preparation

---

- ☀ Preview videos.
- ☀ Make copies of handouts.
- ☀ Cut out **Level of Disease Event Cards**, **NERD Newsfeed Posts**, and **NERD Pandemic Label 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.

- ☀ Create a classroom version of the **Level of Disease Classification** and the **NERD Timeline** (e.g., re-create on whiteboard or large poster or prepare to project the image).



## Videos

---

- ☀ “What exactly is a pandemic?” video (12:39 minutes) for students
- ☀ Activity demonstration video (2:48 minutes) for teachers

[www.cdc.gov/scienceambassador/nerdacademy/defining-the-pandemic.html](http://www.cdc.gov/scienceambassador/nerdacademy/defining-the-pandemic.html)



## Handouts

---

- ☀ **Knowledge Check: Level of Disease** (one per student)
- ☀ **Career Spotlight: Epidemiologist** (one per student or classroom copy)
- ☀ **Level of Disease Event Cards** (one set per group)
- ☀ **Level of Disease Classification** (one per student)
- ☀ **NERD Newsfeed Posts** (one per group)
- ☀ **NERD Timeline** (one per student)
- ☀ **NERD Pandemic Label Cards** (one for each group)



## Introducing the content (30 minutes)

---



### Say aloud

You are likely quite familiar with the word ‘pandemic,’ but do we know exactly what that means? During this video, you will learn how epidemiologists, also known as disease detectives, classify levels of disease occurrence as endemic, or as a cluster, outbreak, epidemic, or pandemic by using number of cases, location, and time. You will also learn how health is defined and about the people involved in keeping us healthy as individuals and as whole communities.

- Hand out the **Knowledge Check: Level of Disease**. Allow students 3–5 minutes to answer the questions on their own. Then, review as a class using the **Knowledge Check: Answer Key** provided.
- Hand out or display the **Career Spotlight**. Discuss the role of an epidemiologist.

## Activity: Part 1 (15 minutes)

### Say aloud

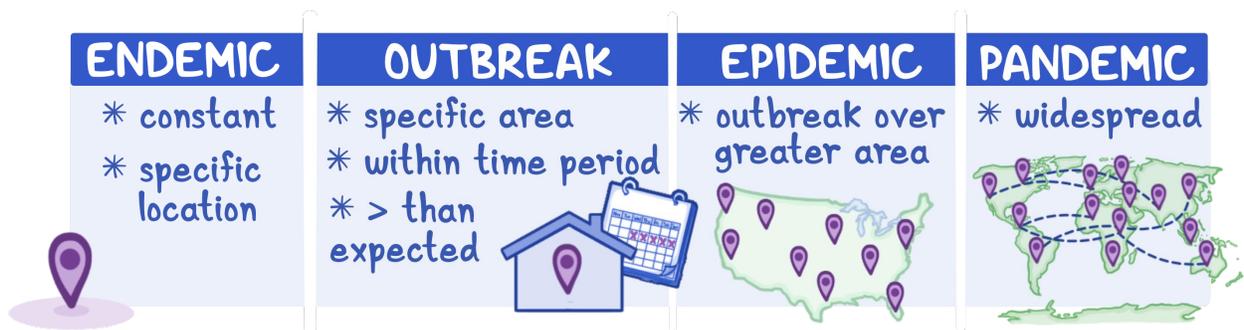
Now that you have seen how an epidemiologist uses data to classify levels of disease occurrence, your team will examine eight different disease events. You will compare patterns in the number of cases, location, and time and categorize them into one of four levels of disease: endemic, outbreak, epidemic, and pandemic. You will use evidence from the event cards to justify your choices.

Each card reflects actual data from a historic disease event. With any time remaining after you categorize the events, your team can propose a disease which could be responsible each event.

- 1 Divide students into groups of 3–5. Hand out one set of **Level of Disease Event Cards** per group and one **Level of Disease Classification** handout per student.
- 2 Ask groups to categorize event cards into levels of disease occurrence (endemic, outbreak, epidemic, pandemic) and record their categorization choices on their **Level of Disease Classification** handout.

If time permits, groups could propose a disease which might be responsible for each event.

- 3 Ask for volunteers to share event card categorization and possible diseases while completing the classroom version of **Level of Disease Classification**. Discuss criteria used for categorizing events into each level of disease occurrence and allow students to recategorize on their info sheet as necessary.





## Activity: Part 2 (20 minutes)

---



### Say aloud

Now that you know more about how public health experts use levels to describe a disease event, you will classify levels of a novel emerging respiratory disease (NERD). Your group will read posts from the NERD Newsfeed. You will observe how NERD spreads, starting with reports of 44 initial cases in the fictional country of Rocona. Using the posts, you will create a timeline of events and then decide when NERD should be declared a pandemic.

Remember by declaring a pandemic, international cooperation can begin; however, if you declare it too early, too much time and resources may be spent unnecessarily. You must be able to explain why you made your decision using evidence from the timeline.

- 1 Hand out the individual **NERD Newsfeed Posts** to each group. Hand out a **NERD Timeline** to each student. Provide the optional **NERD Factsheet** to each group for additional reference.
- 2 As a class, choose and read one NERD Newsfeed Post aloud. Demonstrate how to record relevant information (e.g., location, number of cases, type of spread) appropriately on the **NERD Timeline**. See the **NERD Timeline: Answer Key** for reference.

For an additional challenge, students can create their timeline starting with a blank sheet of paper.

- 3 After completing the first card together, instruct groups to continue reading the **NERD Newsfeed Posts**, one at a time, marking information on the timeline as demonstrated.
- 4 Ask for volunteers to help create the classroom version of the NERD outbreak timeline on the wall or board.
- 5 Hand out a **NERD Pandemic Label Card** to each group. Have groups discuss at which point in time they believe NERD should be declared a pandemic and why. Instruct them to mark their groups' timeline with a "P" and reference the newsfeed posts to determine the exact date they chose. Remind them that they will need to use evidence to justify their answer.
- 6 Ask for a volunteer from each group to place their group's completed **NERD Pandemic Label Card** on the classroom timeline to indicated when their group believes NERD should be declared a pandemic.
- 7 As a class, review the classroom version of the NERD timeline and discuss when groups believed NERD should be declared a pandemic and why.



## Class discussion (10 minutes)

---

- ☀ Why is it that a disease may be categorized differently in different locations? (e.g., malaria is endemic in many countries, but a single local case must be reported immediately in Iowa, United States).
- ☀ Do all diseases become pandemics? Why or why not?
- ☀ Why might a novel virus be more likely to cause a pandemic level of disease than a virus that is not novel?



## Definitions

---

**Case:** A single instance of disease, injury, or other health condition that meets selected criteria of clinical and laboratory findings and for person, place and time.

**Cluster:** A group of cases of the same general health problem that occur in a limited geographical area without regard to the expected levels.

**Endemic:** The constant amount of a specific disease that is usually present in a geographic location, like a state or country.

**Epidemic:** Similar to an outbreak, but with a larger number of cases or occurring over a greater area or both.

**Epidemiology:** The study of disease and other health outcomes, their occurrence and causes in a population, and the application of this study to control health problems.

**Expected level (baseline):** An observed amount of disease that is usually present in a community or geographic location, like a state or country, known through historical counts or public health surveillance, and often used for comparison in identifying outbreaks or measuring the effectiveness of public health actions.

**Novel virus:** A virus that has not been seen before or is a virus that is known but has not infected humans before.

**Outbreak:** A higher number of cases than expected in an area within a certain time period.

**Pandemic:** Similar to epidemic, but has spread over several countries or continents, usually affecting a large number of people.

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



## Extension ideas

---

- ☀ Share the text of the World Health Organization’s (WHO) decision to declare COVID-19 a pandemic on March 11, 2020: <https://www.who.int/director-general/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020>. Discuss the criteria WHO used to make that decision and the implications for the rest of the world.
- ☀ Read WHO’s global influenza preparedness plan and how influenza pandemics are classified in six different phases with overarching public health goals: [https://www.who.int/csr/resources/publications/influenza/WHO\\_CDS\\_CSR\\_GIP\\_2005\\_5.pdf](https://www.who.int/csr/resources/publications/influenza/WHO_CDS_CSR_GIP_2005_5.pdf).
- ☀ Read “The elusive definition of pandemic influenza” by Peter Doshi: <https://www.who.int/bulletin/volumes/89/7/11-086173.pdf>. In June 2009, WHO declared H1N1 a pandemic. Governments throughout the world mounted a large and costly response to the H1N1 influenza outbreak, however the outbreak had far less consequences than predicted. Discuss how this controversy might have impacted WHO’s decision to declare COVID-19 a pandemic in 2020.
- ☀ Debate if you believe COVID-19, which was declared a worldwide pandemic in March 2020, will become endemic. Consider this news article to help frame your argument: <https://www.usatoday.com/story/news/health/2021/02/17/covid-19-likely-become-endemic-experts-say-heres-what-means/4487953001/>.
- ☀ Assign students to research the history and create timelines of past pandemics. Use the CDC website on flu pandemics as a resource: <https://www.cdc.gov/flu/pandemic-resources/basics/past-pandemics.html>.
- ☀ Explore more about malaria, it’s connection to the origins of the CDC, and how, by 1951, malaria was considered eliminated from the United States: <https://www.cdc.gov/malaria/about/history/index.html>. Continue exploring current interventions to reduce the number of malaria-related cases and deaths worldwide: [https://www.cdc.gov/malaria/malaria\\_worldwide/reduction/index.html](https://www.cdc.gov/malaria/malaria_worldwide/reduction/index.html).

## CDC Resources

Introduction to Public Health (PH 101 Series)

<https://www.cdc.gov/publichealth101/public-health.html>

Introduction to Epidemiology

<https://www.cdc.gov/csels/dsepd/ss1978/lesson1/section1.html>

What is Epidemiology?

<https://www.cdc.gov/careerpaths/k12teacherroadmap/epidemiology.html>

Epidemic Disease Occurrence (Principles of Epi Lesson 1, Section 11)

<https://www.cdc.gov/csels/dsepd/ss1978/lesson1/section11.html>

Identifying the Source of the Outbreak

<https://www.cdc.gov/coronavirus/2019-ncov/cases-updates/about-epidemiology/identifying-source-outbreak.html>

COVID-19 Frequently Asked Questions

<https://www.cdc.gov/coronavirus/2019-ncov/faq.html>

The CDC NERD Academy curriculum was developed by the Centers for Disease Control and Prevention's (CDC's) Science Ambassador Fellowship (SAF) program with input from STEM teachers and public health experts. 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 prior to a vaccine becoming available. Some details have been generalized for educational purposes.



# Knowledge Check: Level of Disease

**Directions:** After watching the “What exactly is a pandemic?” video (12:39 minutes), answer the following questions.

- 1 Which of the following best explains an individual’s health?
- a. Physical state
  - b. Mental state
  - c. Social well-being
  - d. All of the above

2 Determine if the following statements about public health are true or false.

True	False
------	-------

Fill in the blank	Example
	An individual's health is affected by their genetics and environment.
	A person who is sick would be treated by an epidemiologist.
	Public health focuses on the health of groups or communities of people.
	Epidemiologists only deal with infectious disease.
	An infectious agent that has been newly identified is called novel.

3 Order the following terms from the smallest (1) to largest (4) level of disease occurrence.

Epidemic	Outbreak	Pandemic	Cluster
----------	----------	----------	---------



# Knowledge Check: Answer Key

**Directions:** After watching the “What exactly is a pandemic?” video (12:39 minutes), answer the following questions.

- 1 Which of the following best explains an individual’s health?
- a. Physical state
  - b. Mental state
  - c. Social well-being
  - d. **All of the above (Correct answer)**

2 Determine if the following statements about public health are true or false.

True	False
------	-------

Fill in the blank	Example
True	An individual's health is affected by their genetics and environment.
False	A person who is sick would be treated by an epidemiologist.
True	Public health focuses on the health of groups or communities of people.
False	Epidemiologists only deal with infectious disease.
True	An infectious agent that has been newly identified is called novel.

3 Order the following terms from the smallest (1) to largest (4) level of disease occurrence.

Epidemic	Outbreak	Pandemic	Cluster
3	2	4	1

# Career Spotlight



CDC NERD Academy



## Epidemiologist

An epidemiologist, also known as a disease detective, investigates the causes of diseases, how diseases are spread, and how diseases can be prevented or controlled. During an outbreak, epidemiologists collect and analyze information about who is sick, when they became sick, and exposures they may have had before becoming sick to determine where, when, and how each person may have become infected. Then, they translate this information into recommendations for prevention and control measures.



**Meet Ezra,  
an epidemiologist**

### *Who do they work with?*

Epidemiologists collaborate with a wide range of public health professionals at the local, state, and federal levels, including other epidemiologists, hospital and health department staff, data managers, biostatisticians, laboratory scientists, health educators, communication specialists, policy makers, and animal health personnel (like veterinarians).

### *Where do they work?*

Epidemiologists may work in local, state, federal, and international public health agencies; hospitals; universities; and anywhere an investigation requires their detective skills.

### *What skills do they use?*

Knowledge of descriptive and analytic epidemiology, ability to analyze data and interpret findings, ability to think critically and problem solve, strong math skills, ability to communicate clearly to different audiences, willingness to work in different environments, and ability to work collaboratively with other experts and public health partners.

### *What qualifications do they need?*

Epidemiologists often have a bachelor's degree in any science field, such as nutrition, public health, or biology, and a master's or doctoral degree in epidemiology. Undergraduate degrees in mathematics (especially statistics) or the social sciences (such as geography or sociology) are also useful.



# NERD Factsheet



CDC NERD Academy

**N**OVEL  
**E**MERGING  
**R**ESPIRATORY  
**D**ISEASE

## 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.

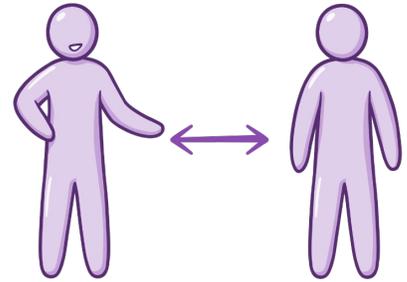
**Be aware of the signs of severe disease, including trouble breathing, pain or pressure in the chest, confusion, or trouble waking or staying awake. If someone is showing any of these signs, seek emergency medical care immediately.**



## 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.



## Event 1

### Time

March 2014–February 2016

### Person

15,261 laboratory-confirmed cases

### Place

Guinea, Sierra Leone, and Liberia

### Signs and symptoms

Fever, severe headache, muscle pain, weakness, fatigue, diarrhea, vomiting, abdominal (stomach) pain, and unexplained hemorrhage (bleeding or bruising)

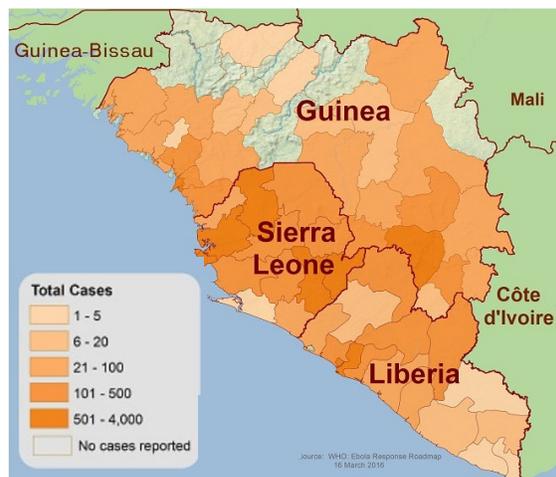


Figure 1: Total number of cases, March 2014–February 2016. On this map of Guinea, Sierra Leone, and Liberia total cases categories are 1–5 cases, 6–20 cases, 21–100 cases, 101–500 cases, 501–4,000 cases, and no cases reported.



## Event 2

### Time

January 4, 2015–April 2, 2015

### Person

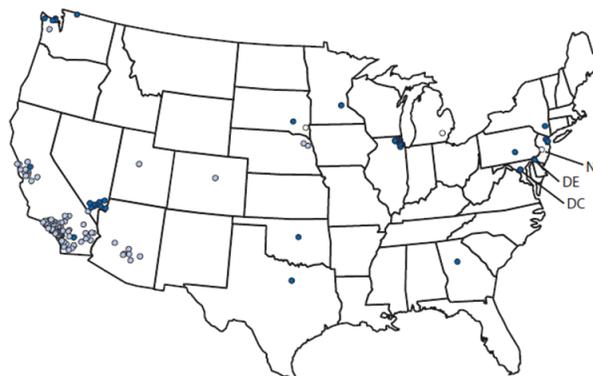
125 confirmed cases

### Place

8 U.S. states, mostly California (n = 110 cases)

### Signs and symptoms

Rash lasting  $\geq 3$  days, fever, cough, coryza (runny nose), and conjunctivitis (pink eye)



■ Non-Disney import-associated (n = 43)  
 ■ Disney import-associated (n = 111)  
 □ Unknown source (n = 5)

Figure 2: Number of reported cases (n = 159) by infection source, state, and county. Forty-three cases are non-Disney import-associated, 111 are Disney import-associated and 5 are of unknown source. On this map of the United States, cases are shown in 8 U.S. states with most of the cases in southern California (n = 110).

## Event 3

### Time

1998 to present day

### Person

About 10,000 cases reported each year in the United States

### Place

Primarily Southwest United States

### Signs and symptoms

Tiredness, cough, fever, shortness of breath, headache, muscle aches or joint pain, and rash on upper body or legs; can cause chronic pneumonia in severe cases

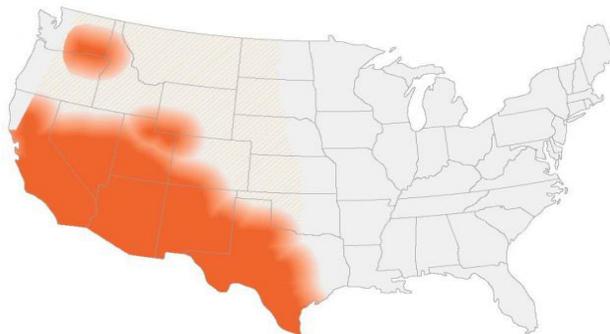


Figure 3: Areas at risk for exposure in the United States. On this map of the United States, most areas at risk for exposure are in the southwestern part of the United States.



## Event 4

### Time

April 2009–April 2010

### Person

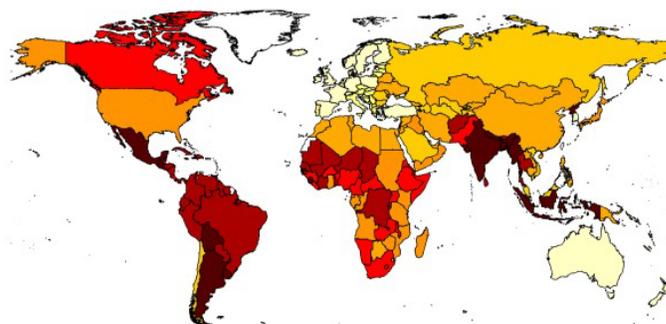
18,631 laboratory-confirmed cases, though between 123,000 and 203,000 were estimated globally for the last 9 months of 2009

### Place

168 countries

### Signs and symptoms

Fever or feverish chills, cough, sore throat, runny or stuffy nose, muscle or body aches, headache, fatigue, vomiting (in children), and diarrhea (in children)



Mortality rates per 100,000



Figure 4: Projected worldwide mortality rates per 100,000 persons (all ages). This world map shows rates per 100,000 by country, including the United States (2–2.5), Canada (3–3.5), South American countries (2.5–4+), African countries (1.5–4+), European countries (0–2.5), Asian countries (1.5–4+) and Australia (0–1).

# Event 5

## Time

1990–Present day

## Person

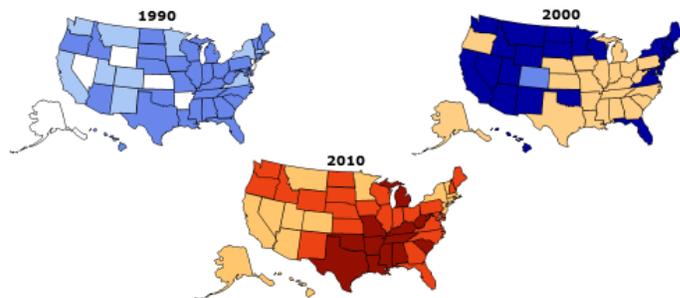
36.5% Adults (aged 18+ years)  
17.0% Children (aged 2–17 years)

## Place

Widespread, United States

## Signs and symptoms

Body Mass Index (BMI)  $\geq 30.0$  adults, BMI  $\geq 95^{\text{th}}$  percentile in children



Level of disease by percent

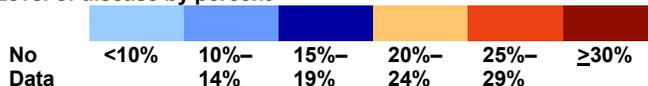


Figure 5: Level of disease over time in the United States. On the map for year 1990, states show a level of disease of <10%, 10%–14%, or No Data. On the map for year 2000, states show a level of disease of 10%–14%, 15%–19% or 20%–24%. On the map for year 2010, states show a level of disease of 20%–24%, 25%–29%, or  $\geq 30\%$ .



# Event 6

## Time

Present day

## Person

84,000–170,000 severe cases annually

## Place

West, East and Central Africa

## Signs and symptoms

Fever and feverish chills, severe headache, back pain, general body aches, nausea, and vomiting; in severe cases, high fever, jaundice, bleeding, and multiple organ failure



Figure 6: Areas with risk of transmission in Africa. On this map of Africa, countries where vaccinations are recommended are mostly in central Africa, countries where vaccinations are generally not recommended are mostly in eastern Africa, and countries where vaccinations are not recommended are in north and south Africa.

## Event 7

### Time

March 31, 2019–February 15, 2020

### Person

2,807 hospitalized cases or deaths

### Place

United States

### Signs and symptoms

Pneumonia-like symptoms, coughing, chest pain, and shortness of breath

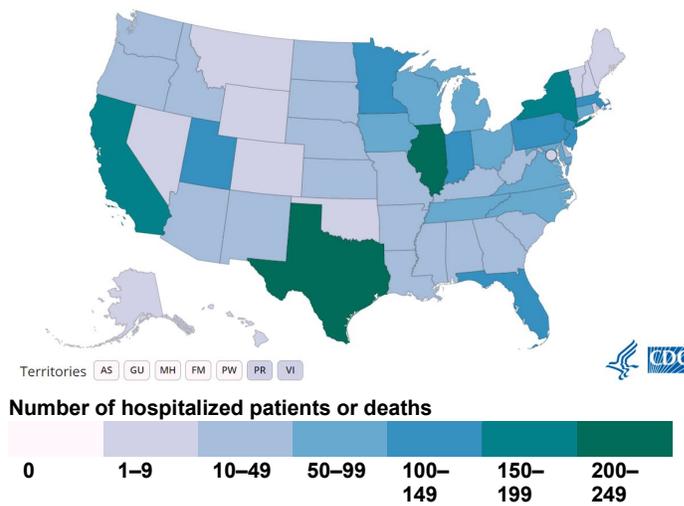


Figure 7: Number of hospitalized patients or deaths per state as of February 18, 2020. On this map of the United States, most states have 0–99 cases, some states show 100–149 cases, two states show 150–199 cases (New York and California), and two states show 200–249 cases (Texas and Illinois).



## Event 8

### Time

November 2015–January 2016

### Person

55 cases

### Place

11 U.S. states, mostly Washington (n = 27) and Oregon (n = 13)

### Signs and symptoms

Stomach cramps, diarrhea (often bloody), and fever

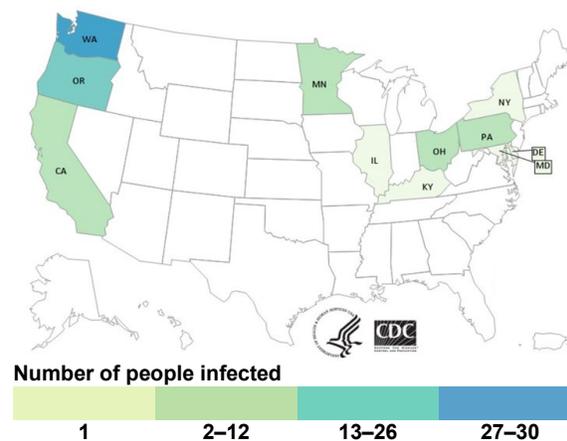


Figure 8: People infected, by state of residence, as of January 27, 2016 (n = 55). On this map of the United States, there are five states with 1 case (Delaware, Illinois, Kentucky, Maryland, New York), 4 states with 2–12 cases (California, Minnesota, Ohio, Pennsylvania), one state with 13–26 cases (Oregon), and one state with 27–30 cases (Washington).

# Level of Disease Classification

**Directions:** Review the event cards. Classify each event by level of disease occurrence (endemic, outbreak, epidemic, pandemic). Record your answers below and justify your answer. Brainstorm the disease that could be represented by each event.

ENDEMIC	OUTBREAK	EPIDEMIC	PANDEMIC
<ul style="list-style-type: none"> <li>* constant</li> <li>* specific location</li> </ul>	<ul style="list-style-type: none"> <li>* specific area</li> <li>* within time period</li> <li>* &gt; than expected</li> </ul>	<ul style="list-style-type: none"> <li>* outbreak over greater area</li> </ul>	<ul style="list-style-type: none"> <li>* widespread</li> </ul>
			

Event	Level of disease	Justification	Disease
1			
2			
3			

4			
5			
6			
7			
8			

# Level of Disease Classification: Answer Key

**Directions:** Review the event cards. Classify each event by level of disease occurrence (endemic, outbreak, epidemic, pandemic). Record your answers below and justify your answer. Brainstorm the disease that could be represented by each event.

ENDEMIC	OUTBREAK	EPIDEMIC	PANDEMIC
<ul style="list-style-type: none"> <li>* constant</li> <li>* specific location</li> </ul> 	<ul style="list-style-type: none"> <li>* specific area</li> <li>* within time period</li> <li>* &gt; than expected</li> </ul> 	<ul style="list-style-type: none"> <li>* outbreak over greater area</li> </ul> 	<ul style="list-style-type: none"> <li>* widespread</li> </ul> 

Event	Level of disease	Justification	Disease
1	Epidemic	This event card is based on the 2014–2016 Ebola epidemic in West Africa. More than the expected number of cases occurred in multiple countries. Overall, it is considered an epidemic because it was primarily contained in the region of West Africa.	Ebola
2	Outbreak	This event card is based on a 2015 multistate measles outbreak. It is considered an outbreak because it is linked to a single case at an amusement park in California.	Measles
3	Endemic	This event card is based on valley fever, which is caused by a fungus that lives in the soil. It is considered endemic because about 10,000 cases are expected to be reported in the United States each year, mostly from Arizona and California.	Valley Fever

Event	Level of disease	Justification	Disease
4	Pandemic	This event card is based on the 2009–2010 H1N1 influenza pandemic. It was declared a worldwide pandemic on June 11, 2009. At the time, more than 70 countries had reported cases of 2009 H1N1 infection, and community level outbreaks of 2009 H1N1 were ongoing in multiple parts of the world.	H1N1 Influenza
5	Epidemic	This event card is based on obesity levels in the United States during 1990–present. In 1999, obesity was declared an epidemic because of the growing rates of obesity in the United States across all ages and racial groups. (Although this is more an issue of word choice since a true epidemic is an event and not a trend).	Obesity
6	Endemic	This event card is based on yellow fever in Sub-Saharan Africa. It is considered endemic because there are about 84,000–170,000 severe cases annually.	Yellow Fever
7	Outbreak	This event card is based on a 2019–2020 outbreak of EVALI (e-cigarette, or vaping, product use-associated lung injury) in the United States. A rapid increase in cases led to a total of 2,807 hospitalizations and deaths reported from 50 states, the District of Columbia, and two U.S. territories (Puerto Rico and the U.S. Virgin Islands) during March 31, 2019–February 15, 2020.	EVALI (e-cigarette or vaping product use-associated lung injury)
8	Outbreak	This event card is based on the initial, larger outbreak of Shiga toxin-producing <i>Escherichia coli</i> O26 (STEC O26) infections linked to food served at a chain of fast casual Mexican restaurants in 2015. Although 55 cases of infection occurred across 11 states, the same STEC O26 strain was isolated in each case suggesting that a common food item distributed to multiple restaurants was the likely cause.	Shiga toxin-producing <i>Escherichia coli</i> O26 (STEC O26)

## Resources

---

- ☀ Event 1  
Learn more at: <https://www.cdc.gov/vhf/ebola/symptoms/index.html>. The image referenced on the event card can be found at: <https://www.cdc.gov/vhf/ebola/history/2014-2016-outbreak/distribution-map.html>
- ☀ Event 2  
Learn more at: <https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6414a1.htm>. The image referenced on the event card can be found at that link.
- ☀ Event 3  
Learn more at: <https://www.cdc.gov/fungal/features/valley-fever.html>. The image referenced on the event card can be found at that link.
- ☀ Event 4:  
Learn more at <https://www.cdc.gov/h1n1flu/cdcresponse.htm>. The image referenced on the event card can be found at: <https://www.ncbi.nlm.nih.gov/pubmed/24302890>.
- ☀ Event 5  
Learn more at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2608606/?page=1> and <https://www.cdc.gov/obesity/index.html>. The image referenced on the event card can be found at: <https://www.cdc.gov/obesity/data/prevalence-maps.html>.
- ☀ Event 6  
Learn more at: <https://www.cdc.gov/yellowfever/index.html>. The image referenced on the event card can be found at: <https://www.cdc.gov/yellowfever/maps/africa.html>.
- ☀ Event 7  
Learn more at: [https://www.cdc.gov/tobacco/basic\\_information/e-cigarettes/severe-lung-disease.html](https://www.cdc.gov/tobacco/basic_information/e-cigarettes/severe-lung-disease.html). The image referenced on the event card can be found at: [https://www.cdc.gov/tobacco/basic\\_information/e-cigarettes/severe-lung-disease.html#map-cases](https://www.cdc.gov/tobacco/basic_information/e-cigarettes/severe-lung-disease.html#map-cases).
- ☀ Event 8  
Learn more at: <https://www.cdc.gov/ecoli/2015/o26-11-15/index.html>. The image referenced on the event card can be found at: <https://www.cdc.gov/ecoli/2015/o26-11-15/map.html>.

# NERD Newsfeed Posts



 **Nerd Tracker**  
**@CDC\_NERDNews**  
**January 3**  
44 cases of a novel emerging respiratory disease reported to the World Health Organization in the country of Rocona.

 **Nerd Tracker**  
**@CDC\_NERDNews**  
**January 20**  
Imported cases of a novel emerging respiratory disease are confirmed: 2 in Thailand, 1 in Japan, and 1 in South Korea. All patients recently travelled to Rocona. To date, cases are confined to Asia.

 **Nerd Tracker**  
**@CDC\_NERDNews**  
**January 21**  
This novel emerging respiratory disease is named NERD. United States reports first travel-related case of NERD in the state of Washington. The patient recently returned from the country of Rocona.

 **Nerd Tracker**  
**@CDC\_NERDNews**  
**January 30**  
CDC confirms first human-to-human spread in U.S. Chicago, IL, woman infected her husband with NERD. Wife recently returned from overseas travel.

 **Nerd Tracker**  
**@CDC\_NERDNews**  
**February 15**  
Egypt reports first confirmed NERD case on the continent of Africa.

 **Nerd Tracker**  
**@CDC\_NERDNews**  
**February 22**  
Of the 346 confirmed NERD cases in South Korea, 80% were related to two nearby facilities. 169 (48.8%) cases tied to a church and 108 (31.2%) to a nearby hospital.

 **Nerd Tracker**  
**@CDC\_NERDNews**  
**March 7**  
CDC confirms community transmission of NERD occurred at two family gatherings in Chicago, IL. The 16 confirmed cases included 3 deaths.

 **Nerd Tracker**  
**@CDC\_NERDNews**  
**March 9**  
Italy announces travel restrictions for over 60 million people as the number of NERD cases climbs to 9,172 with 1,598 deaths.

 **Nerd Tracker**  
**@CDC\_NERDNews**  
**March 11**  
NERD outbreaks have been reported in just over half (58%) of countries worldwide with 118,319 total cases (approximately .0015% of the world's population).



**Nerd Tracker  
@CDC\_NERDNews  
March 17**

High NERD attack rate after exposure during choir practice in Skagit County, WA. Of 61 in attendance, 32 confirmed & 20 probable cases occurred. In total, 3 are hospitalized and 2 dead.



**Nerd Tracker  
@CDC\_NERDNews  
March 26**

Canada reports 1,670 new cases of NERD bringing the total cases for the country to 3,409 with 35 deaths.



**Nerd Tracker  
@CDC\_NERDNews  
April 4**

The number of confirmed NERD cases reported tops one million worldwide with over 56,000 deaths.



**Nerd Tracker  
@CDC\_NERDNews  
April 27**

NERD among workers in meat and poultry processing plants reported in 19 U.S. states. Among approximately 130,000 workers at these facilities, 4,913 cases and 20 deaths occurred.



**Nerd Tracker  
@CDC\_NERDNews  
April 28**

U.S. reports NERD tops one million cases. U.S. accounts for 1/3 of all reported cases worldwide.



**Nerd Tracker  
@CDC\_NERDNews  
May 11**

Number of NERD cases tops 4 million worldwide as reported in 181 countries (93%) on 6 of the 7 continents.



**Nerd Tracker  
@CDC\_NERDNews  
June 11**

NERD cases increasing in rural U.S. communities. In total, 30 persons with laboratory-confirmed NERD attended Amish religious and social gatherings in the Ohio community.



**Nerd Tracker  
@CDC\_NERDNews  
June 16**

Transmission of NERD associated with sports. In total 13 laboratory-confirmed cases linked to recreational hockey game in Florida.



**Nerd Tracker  
@CDC\_NERDNews  
June 27**

Among 344 attendees of an overnight camp in Ohio, 260 (76%) tested positive for NERD despite efforts by camp officials to follow recommended prevention strategies.

## NERD Timeline

---

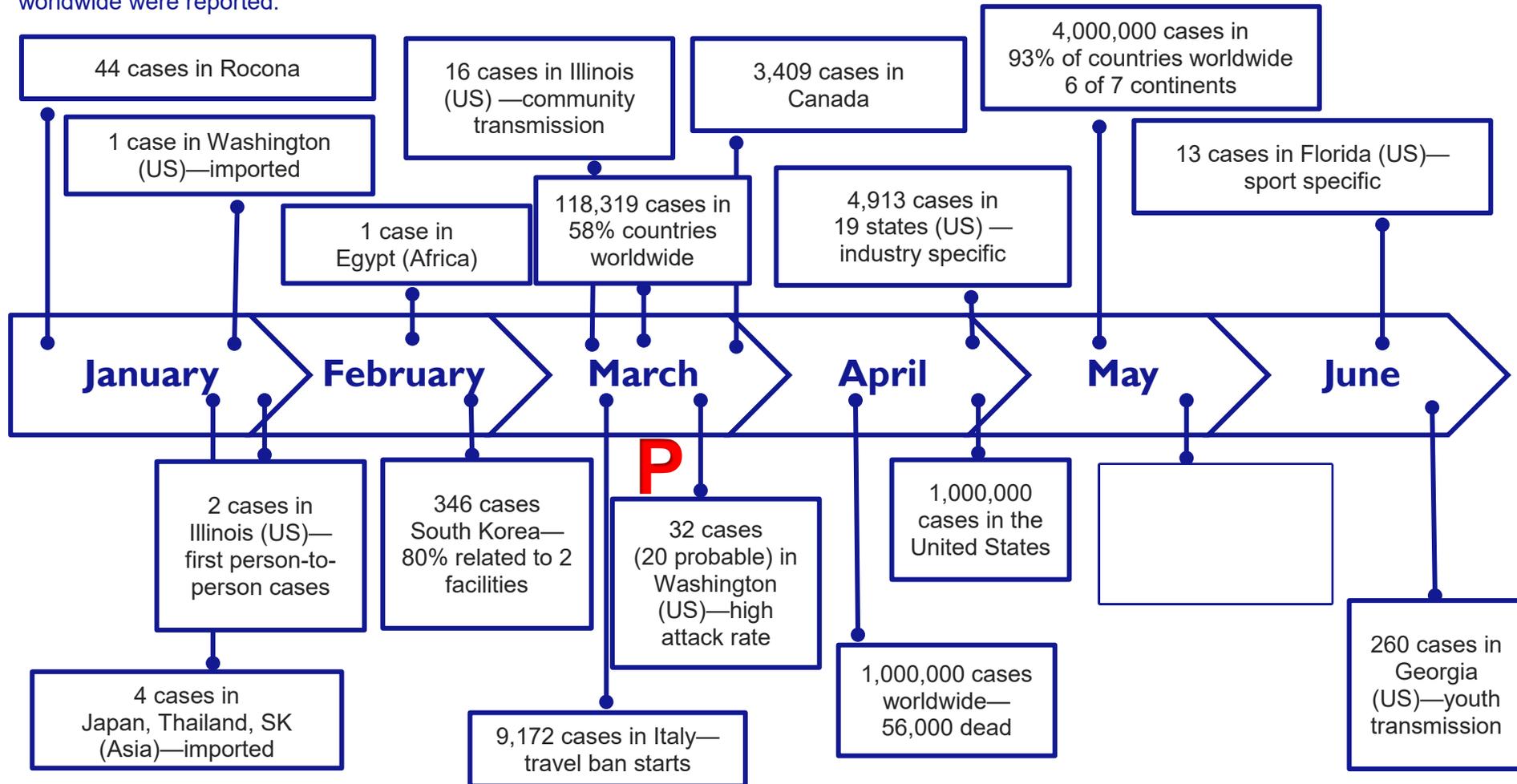
**Directions:** As a group, read each post on the [NERD Newsfeed](#), one at a time. Mark information such as # of cases, location and other important details on the timeline below. When all post details have been recorded, decide when NERD should be declared a pandemic by marking the timeline with a “P”.



# NERD Timeline: Answer Key

**Directions:** As a group, read each post on the **NERD Newsfeed**, one at a time. Mark information such as # of cases, location and other important details on the timeline below. When all post details have been recorded, decide when NERD should be declared a pandemic by marking the timeline with a “P”.

**Answer:** The timeline is provided below. NERD could be declared a pandemic in March after 118,319 cases in 58% of countries worldwide were reported.



**Image Description:** Timeline of events starting from January to June. January Events: 44 cases in Rocona, 1 Case in Washington (US)-Imported, 2 Cases in Illinois (US)-first person-to-person cases, and 4 cases in Japan, Thailand, SK (Asia)-Imported. February Events: 1 case in Egypt (Africa), and 346 cases South Korea-80% related to 2 facilities. March events: 16 cases in Illinois (US)-community transmission, 3,409 cases in Canada, 32 cases (20 probable) in Washington (US)-high risk attack rate, 118,319 cases in 58%of countries world wide, and 9,172 cases in Italy-travel ban starts. April Events: 4,913 cases in 19 states (US)-industry specific, 1,000,000 cases in United States, and 1,000,000 cases worldwide-56,000 dead. May Events: 4,000,000 cases in 93% of countries worldwide 6 of 7 continents, and 30 cases in Ohio (US)-rural transmission. June Events: 13 cases in Florida (US)-sport specific, and 260 cases in Georgia (US)-youth transmission.

# NERD Pandemic Label Cards



**P**

*NERD Pandemic Declaration*

---

**Group name**

**Date**

**Justification**

**P**

*NERD Pandemic Declaration*

---

**Group name**

**Date**

**Justification**

**P**

*NERD Pandemic Declaration*

---

**Group name**

**Date**

**Justification**

**P**

*NERD Pandemic Declaration*

---

**Group name**

**Date**

**Justification**

**P**

*NERD Pandemic Declaration*

---

**Group name**

**Date**

**Justification**

**P**

*NERD Pandemic Declaration*

---

**Group name**

**Date**

**Justification**