Eradicating Smallpox – Student Instructions

Solve the Outbreak

Although smallpox has been globally **eradicated**, many other infectious diseases that could potentially be eradicated, such as measles and polio, have not. The **epidemiology** principles used on smallpox are currently being used worldwide to **eradicate** diseases like polio and to control outbreaks of other diseases that cannot be eradicated due to the presence of disease **reservoirs**. Training programs on these principles are needed to prepare healthcare workers and other public health officials in **epidemiology**.

The Epidemic Intelligence Service (EIS) was created in 1951. Originally part of the U.S. government's efforts to detect biological warfare during the Korean War, its success in detecting and responding to outbreaks led to it continuing today. Now, it is a 2-year training program for health professionals interested in the practice of applied **epidemiology**, or the study of diseases in populations. During their time at CDC, these professionals are called EIS officers. EIS Officers earned the nickname of "disease detectives" because they practice "shoe-leather" detective work, wearing down their shoes as they go door-to-door to investigate outbreaks.

CDC has created a disease detective game for students to solve disease outbreak mysteries. You will study a disease outbreak just as an EIS officer would and determine a plan to treat the affected individuals and to stop the outbreak from spreading. There are 20 different outbreaks for you to explore. See how many you can complete!

https://www.cdc.gov/mobile/applications/sto/web-app.html

Write a Field Handbook or Case Study

You have two possible summary projects to choose from for this task: write a field handbook for **epidemiologists** or write a case study for one of the cases you explored. Though each of the 20 cases is very different, they do have things in common. Using their disease detective skills, **epidemiologists** can systematically narrow down the possibilities to isolate the pathogen or other agent responsible. The public health approach has four general steps:

1) Surveillance – What is the problem?
2) Risk factor identification – What is the cause?
3) Intervention evaluation – What works to solve the problem?
4) Implementation – How will you solve the problem?

As you reflect on the cases, how did you use these four steps to stop the disease in its tracks?

You may choose to make a physical handbook or a digital one. Whichever format you choose, be prepared to share it with others.

Option 1: Field Handbook

While you were working your way through the cases, you gained skills that helped you solve the outbreaks. This task asks you to write a field handbook for **epidemiologists** that summarizes what you learned to help those who come after you.

In your handbook, you will also want to include:

- **Interview Guidelines:** Who should you interview? What information do you need to collect?
- **Analyzing Interview Data:** Once you have completed interviews, how do you analyze the data?
- **Attack Rate:** How do you calculate the attack rate? How do you use it to identify the source of the illness?
- **Epidemic Curves:** Why might you want to make an epi curve? What can it tell you?
- **Identifying the Cause(s):** What steps might you take to identify the cause using the data you have collected?
- **Stopping the Spread:** How do you work with organizations in the area to implement your plan to stop the spread?
- **Preventing Further Cases:** What other measures might be needed to prevent the outbreak from reoccurring?

Option 2: Case Study Report

Reporting your findings after investigating a disease outbreak is a critically important task. The next time an outbreak of this disease occurs, case notes from previous outbreaks can prove to be valuable tools for preventing illness and saving lives.

Choose one of the available outbreak case studies and create a summary report.

- **Summary:** Start with a quick 2-3 sentence intro summarizing the entire case study.
- **Affected Individuals:** Who was affected? How many people? Describe their demographics.
- **Symptoms:** What symptoms did the affected individuals show?
- **Common Factors:** What did all the affected individuals have in common?
- **Data:** What tests did you run? What data did you analyze? Include screenshots of tables or graphs used.
- **Cause:** What did you determine to be the cause of this outbreak?
- **Treatment Plan:** How did you treat the affected individuals? Did they survive?
- **Prevention Plan:** What measures were put in place to prevent this from happening again?

Share Your Findings

The David J. Sencer CDC Museum uses award-winning exhibits and innovative programming to educate visitors about the value of public health and presents the rich heritage and vast accomplishments of CDC. Your work could be a valuable contribution! Share your demonstration with the CDC Museum on Instagram using **@CDCMuseum**.

The National Center for Emerging and Zoonotic Infectious Diseases (NCEZID) works to protect people at home and around the world from emerging and zoonotic infections ranging from A to Z—anthrax to Zika. We are living in an interconnected world where an outbreak of infectious disease is just a plane ride away. Share your demonstration with NCEZID on Twitter **@CDC_NCEZID**.