

# FIGHTING CHOLERA WITH MAPS

## Preview of Main Ideas

Five hundred people, all from the same section of London, England, died of cholera within a ten-day period in September 1854. Dr. John Snow, a local physician, had been studying the spread of cholera for some time. An early example of medical geography is Dr. Snow's use of maps to prove his long-held theory that cholera was a waterborne infection. Using mapping techniques similar to Snow's, students will analyze maps to see if they can determine the sources of cholera in London. This activity can help students learn how mapping techniques can be used to understand social issues and to solve problems.

## Connection With the Curriculum

This lesson on cholera can be used in geography, world history, and other social studies classes.

**Teaching Level:** Grades 6-12

## Geography Standards

1. How to use maps and other tools and technologies
3. How to analyze the spatial organization of people, places, and environments
17. How to apply geography to interpret the past

**Geography Themes:** Location, Place, Human/Environment Interaction, Movement

## Materials

- One copy of each handout for each student:
  - Handout 1: "Information About Cholera"
  - Handout 2: "Map of Cholera Deaths"
  - Handout 3: "Map of Cholera Deaths and Locations of Water Pumps"
- Overhead projector and transparency of each map (Optional)

## Objectives

Students are expected to

- Examine maps to draw conclusions about cholera deaths in London
- Understand how maps can provide useful information about an issue
- Understand how maps can be used to solve problems

## Opening the Lesson

Have students use atlases to locate Great Britain and London. Tell students that in September 1854, during the last great cholera epidemic in Great Britain, 500 people—all from the same section of London, England—died of the disease within a ten-day period. Bacteria were still unknown. People were panicking. Distribute or read Handout 1 to students.

## Developing the Lesson

Dr. John Snow was a British doctor who had been studying cholera for many years. In trying to

determine the source of cholera, Dr. Snow located every cholera death in the Soho district of London by marking the location of the home of each victim with a dot on a map. Distribute the handout “Map of Cholera Deaths” and have students focus on the spatial distribution of cholera deaths.

Have students formulate questions about the map. (For example, why is there a cluster of deaths near Broad Street? Why are there fewer deaths on Regent Street?) Ask students to speculate as to the spread of cholera deaths. Have students predict the location of pumps. Record student responses on the chalkboard. After discussing the distribution of cholera deaths, distribute Handout 3, “Map of Cholera Deaths and Locations of Water Pumps.” Ask students to formulate additional questions—for example, why were there so many deaths near Broad Street? (Explain to students that water pumps were the only source of drinking water.)

### **Concluding the Lesson**

Ask students what course of action they would take if they were city officials presented with the information on Dr. Snow’s map. Then tell students that Dr. Snow requested city officials to remove the handle from the Broad Street pump, making it impossible to get water there. After his request was granted, the number of new cholera cases in the area declined dramatically—almost to zero. Dr. Snow’s theory was confirmed: Cholera was associated with the drinking water supply, and the water was carrying the disease to its victims.

### **Assessing Student Learning**

Ask students to list the steps that Dr. Snow took in solving the cholera problem in London. Ask them to answer these questions: What if the locations of deaths and locations of water pumps (Handout 3) were not clustered? How might this have altered Dr. Snow’s research and course of action? Have students identify particular problems and issues that might be better understood through map development and analysis—for example, the occurrence of auto accidents, tornadoes, earthquakes, or crimes.

### **Extending the Lesson**

Discuss some questions that are important to medical geographers: Where are diseases found? How do diseases spread? Is there a pattern to the spread of disease? Are some diseases more common in some environments than in others? Are the locations of health-care facilities important? Are they related to patterns of disease?

Have students research the spread of specific diseases, for example, AIDS, smallpox, malaria, or typhoid, then use medical atlases to research and plot the spread of diseases on blank outline maps.

Give students (or have them acquire) information on traffic accidents in your community. (This information should be available from local police or the county sheriff’s office.) Plot the accidents on a map and have students formulate questions and draw conclusions based on the data. Perhaps there is a need for a stop sign, traffic signal, or lower speed limit in a particular area.

### **Additional Reading**

Snow, John. *Snow on Cholera*. New York: Hafner, 1965.

This lesson from *TC Tool Kit: A Resource for Teacher-Consultants*, National Geographic Society, 1993.

## Lesson 9-12 Handout 1: Information About Cholera

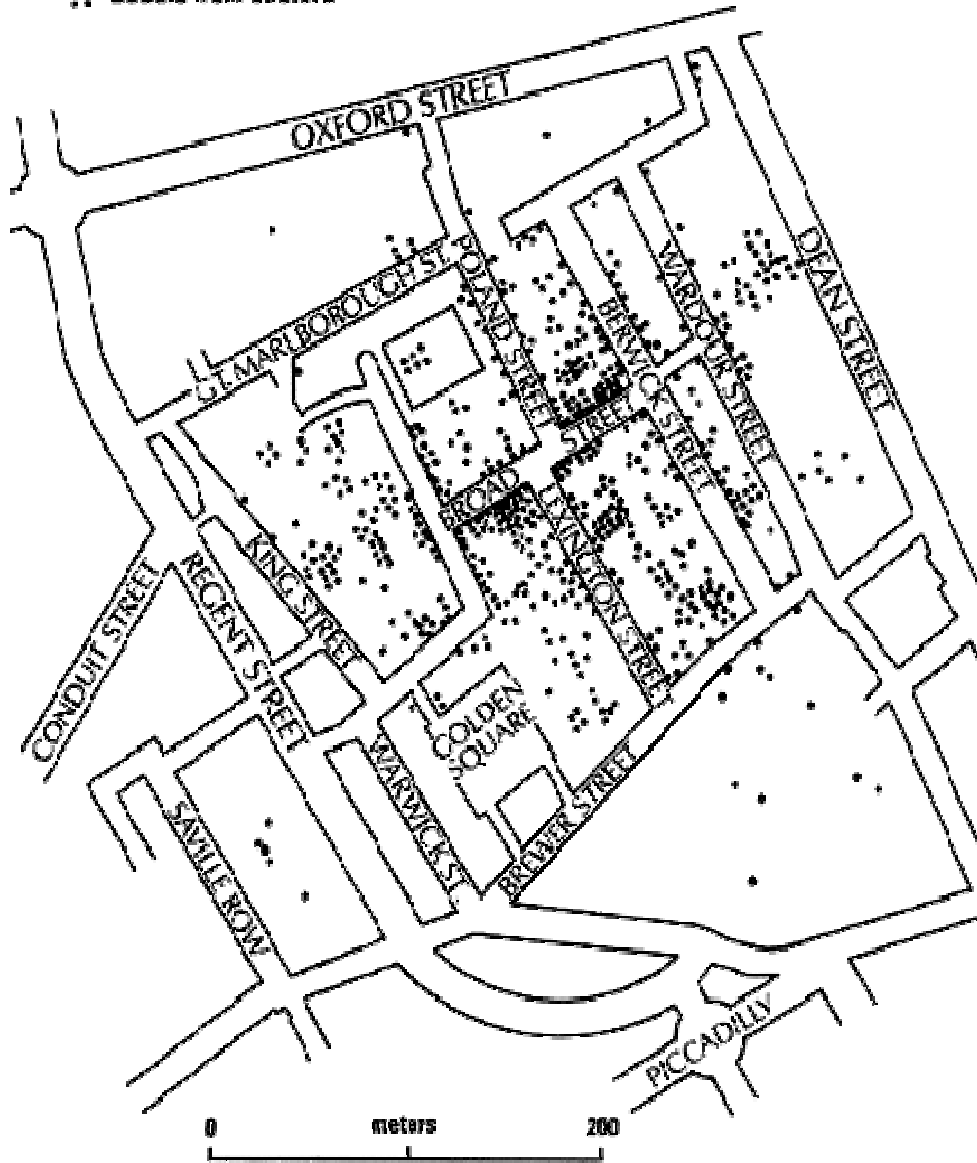
Cholera (also called Asiatic cholera) is a severe, infectious disease of the small intestine. It is marked by heavy diarrhea, vomiting, and muscle cramps and can result in coma and death. For centuries, it was confined to India, but in the early 19th century it began to spread to other parts of Asia, Europe, and the Americas. In the 1970s and 1980s, cholera epidemics occurred in the Middle East and Africa, and there was a localized outbreak of the disease in Naples, Italy. In the early 1990s, an epidemic that began in Peru spread to several other countries in Latin America.

The disease is contracted by ingesting food or drink—usually water—that is contaminated with a bacterium found in feces. After cholera bacteria are swallowed, they multiply in the small intestine, where they set off an infection that interferes with normal intestinal functions. Frequent diarrhea results. This can cause a great deal of fluid loss—water and essential salts—in a short period of time. In some cases, three to four gallons of fluid loss has been reported in a 24-hour period. In addition, vomiting and other symptoms often develop. Sometimes, however, an infected cholera victim will develop only mild diarrhea and can get rid of the disease through excretion. With prompt treatment, recovery is almost certain. Treatment consists of replenishing the body's fluids until the diarrhea stops. Sometimes antibiotics, such as tetracycline, are administered. Unfortunately, about 50 percent of all those who contract cholera are not treated and die of the disease.

Cholera remains common in impoverished tropical and semitropical developing nations where poor sanitation and contaminated water are common. Clean food and drinking water can prevent cholera outbreaks. A vaccine can provide partial protection for a limited time, but the vaccine cannot prevent the spread of infection on a large scale.

## Lesson 9-12 Handout 2: Map of Cholera Deaths

 Deaths from cholera



# Lesson 9-12 Handout 3: Map of Cholera Deaths and Locations of Water Pumps

