

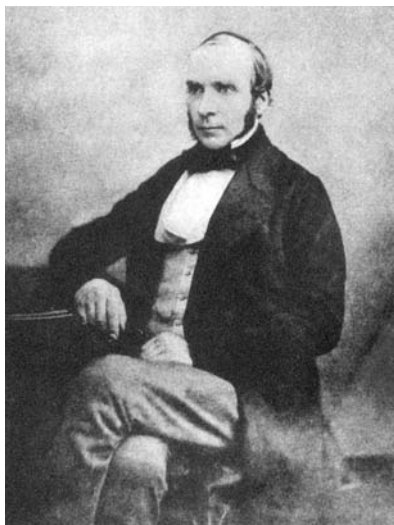
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John Snow and the Search for Evidence



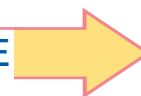
Snow's Theory

Mapping the locations of deaths caused by cholera led Dr. Snow to propose that cholera was being carried in the water.



Dr. John Snow

CHALLENGE



Think about what kinds of evidence would help Dr. Snow prove his theory about how cholera spreads.

DR. SNOW AND THE CHOLERA

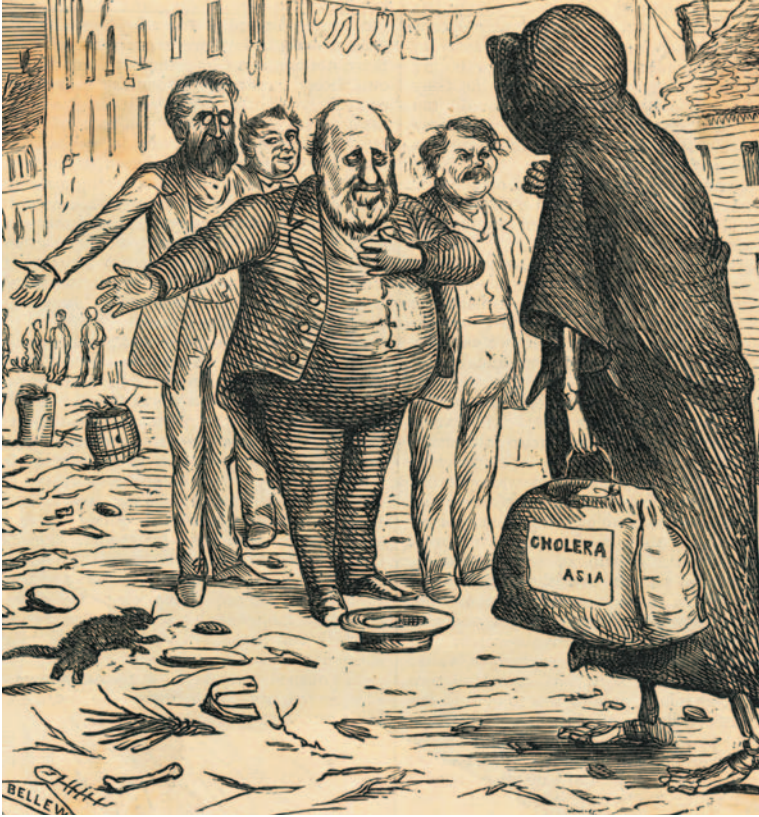
Cholera causes severe diarrhea and vomiting. In India, cholera has been a health problem since 400 B.C., but it was not well known outside the Far East before 1800. In 1819, however, there was an epidemic in Europe and North America. Gradually, cholera almost disappeared, but it would sometimes reappear suddenly in one place or another. A person with cholera might die within a day, sometimes within only a few hours after the first symptoms appeared. People

were confused about the cause of the disease because when some people got cholera, others living nearby would not. Bad air or piled-up trash were often considered to be the cause of cholera.

In 1849, a terrible outbreak of the disease killed over 500 people who lived within a few blocks of each other in London. John Snow, a medical doctor in England, drew a detailed map of the area, showing where each victim lived. Dr. Snow discovered that the deaths came mostly from houses located near a certain public water pump. Lots of people liked to drink from this pump because of the taste and clarity of its water. Some of the deaths were reported in houses farther away from the pump and did not immediately fit the pattern. Even so, after studying all of his data, Dr. Snow suggested that cholera was spread in the water supply by invisible bits of human waste from cholera victims.



Cholera spread rapidly through London in contaminated drinking water.



Cholera was not just a London problem, as seen here in a cartoon from a New York newspaper from the 1800s.

Dr. Snow was concerned that his mapping of the 1849 cholera cases did not provide enough evidence to prove his theory. He began to carefully review public records covering the 20 years before the cholera outbreak. One thing he discovered was that since 1830, about 300,000 people in one area of South London had been served by just two water companies, the Lambeth Water Company and the Southwark and Vauxhall (S & V) Water Company. Originally, both companies drew their water from the Thames River in London. In 1840, however, the Lambeth Water Company changed and began to take its water from the Thames at a place 10 miles upstream. The other company, S & V, continued to get its water from inside London.

When cholera struck again in 1854, Dr. Snow reviewed the records for the area served by the two water companies. He asked his friend and colleague Dr. John Joseph Whiting to help him gather additional evidence concerning the water sources for the city of London. He wanted to provide more proof for his theory.



Searching for More Evidence

Dr. Snow and Dr. Whiting were two investigators who shared their data through writing. The S & V Water Company would not give them the information they wanted, so they had to work hard to collect it. Once they had the information, it had to be carefully organized before they could **infer** the cause of cholera. (Infer means to reach a conclusion on the basis of available evidence.)

GROUP **CHALLENGE**

The imaginary letters that follow are drawn from what is known about the correspondence between the two doctors at the time. As a group, decide if Dr. Snow's theory about the cause of cholera is consistent with the evidence provided in the letters between Dr. Snow and Dr. Whiting.

17 August 1854

John Joseph Whiting
47 Waterloo Road
London, England

Dear Dr. Whiting,

As you are aware, the dreaded cholera has once again come to our city. I have a great interest in showing the powerful influence which invisible bits of human waste in the drinking water have on the spread of cholera. The recent outbreak has given me the opportunity to test my theories on the grandest scale. The S & V Water Company will not give me data, so it will be necessary to collect it by going to each house. I feel the need of your help in this experiment. My current research includes the following results:

- ~ The area of the present outbreak is served by two water companies, S & V and Lambeth.
- ~ Each of the companies supplies both rich and poor; large and small houses, and people of both sexes, all ages, and all occupations.
- ~ Several years ago, the Lambeth Water Company moved its water intake pipe upstream from London's sewage-infested water. I am investigating whether this move is related to a decrease in the number of cholera cases. If so, it would support my idea that cholera is spread by human waste in the water.

To provide evidence to support my theories, I need to learn which company supplied water to each house where a fatal attack of cholera occurred. Would you please collect the numbers of deaths that occurred at houses supplied by the S & V Water Company?

If you are agreeable, I will send you the numbers that I have already collected from houses served by the Lambeth Water Company.

Sincerely, your friend,

John Snow, M.D.

30 April 1855

Dear John,

The information that you requested was obtained with a good deal of trouble. Many hours were needed to collect the data, as I had to go door to door.

The analysis of my data should leave no doubt about the correctness of your hypothesis concerning the progress of cholera. I have combined our data and report it to you as follows:

- ~ S & V Water Company supplied 40,046 houses in which there were 1,263 deaths.
- ~ Lambeth Water Company supplied 26,107 houses in which there were 98 deaths.
- ~ The rest of London is served by other water companies. These companies supplied 256,423 houses in which there were 1,422 deaths.

It has been a pleasure for me to be able to assist you. This experiment is of great importance to the community of London.

Sincerely, your friend,

John Joseph Whiting

INDIVIDUAL CHALLENGE

Make believe you are Dr. John Snow. Write a letter to the London Health Department describing your findings. Your letter should include the following:

- What you think is the cause of the spread of cholera
- All the data you have collected presented in an organized form
- Reasons the Health Department should believe your evidence
- What action you suggest the Health Department should take