

What Happens When There Is A Disease Outbreak?

What Causes a Disease Outbreak?

An *outbreak* is the name given to a sudden increase in the number of people who have the same illness at the same time. Scientists work to stop outbreaks of serious diseases before they cause widespread illness or death.

Sometimes a disease can be stopped from spreading by 1) identifying how and where the disease began and 2) eliminating it. Finding the source of a disease can be complicated. Several years ago, for example, many people suddenly reported getting sick with the same symptoms. Epidemiologists asked questions and listened for common experiences. The source of the illness was *E. coli*. Even though the sick people lived in different states, they had one food item in common. Everyone who had the disease had eaten spinach. Scientists then traced the spinach to what fields it came from. Eventually they learned what had happened. The spinach had been sprayed with water containing harmful *E. coli* bacteria. The water was accidentally contaminated through animal feces from a farm. Finding the source was important. Other *E. coli* outbreaks have been traced to water, meat, and other raw vegetables such as lettuce.

outbreak: sudden increase in the number of people with a disease in a particular time and place.

E. coli: a type of bacteria that can live in the intestines of humans and animals. Some strains of *E. coli* cause severe illness and even death.

Stopping the Spread of Disease

When an *E. coli* outbreak is traced to a food item as the source, the food is recalled. That means stores and restaurants who sell the item stop using it. People who have the food at home don't eat it. Outbreaks caused by *E. coli* bacteria can be contained once the source is found, the contamination problem is fixed, and people stop eating the food. But there is one more important step. Just as *E. coli* was first caused by animal feces from a farm, the feces of an infected person carry the bacteria, too. When an infected person uses the toilet and doesn't wash their hands carefully with soap and water, everything they touch when they get up from the toilet has the bacteria on it. One way to get infected by *E. coli* is to eat contaminated food. Another way to get it is to touch something another person has touched who used the toilet and didn't wash their hands. When you touch something they touched, and then touch your own mouth, you transfer *E. coli* into your own body.



E. coli bacteria on a lettuce leaf.

Keeping People Separated

contain: keeping a disease from spreading

quarantine: keeping infected people away from others to keep infection from spreading.

incubation period: the amount of time between exposure to a disease and beginning to show symptoms. During this time, an infected person is contagious.

All communicable diseases cause problems, and sometimes people die. To contain a communicable disease, it is important to stop infected people from infecting other people. Washing your hands is the most important way to try to keep yourself and others safe. Sometimes, though, people who are contagious are kept in quarantine. They stay in one place, and don't go near other people that they might also infect. However, a person can sometimes be contagious and not know it. This happens when a disease has a long incubation period. The incubation period is the time between when someone is first exposed to a disease and when they start to have symptoms. When incubation periods are long, many people will already be infected by the time an outbreak is discovered. People can spread a disease before they even know they have it. Different communicable diseases have different incubation periods. The Centers for Disease Control and Prevention (the CDC) recommends staying away from other people for 24 hours after your fever is gone if you had the flu. For the flu, that means one whole day of feeling well again before being around other people.



It is important to monitor your body temperature when you are sick.



Washing hands for 20 seconds, with soap, is key to containing communicable diseases.

Stop and Think

Imagine you found out today that you had a mild case of a communicable disease.

1. What are two things you could do to keep other people from getting sick?
Prevent infecting other people with good handwashing, and quarantine - staying in one place and not going near other people who could become infected.
2. Which one of those two would be the easiest for you to do?
Good handwashing is the easiest to do to prevent spread of disease.
3. Which one of those two seems like the most important for you to do?
Always washing your hands well with soap and water.
4. Extension: A term associated with COVID-19 is *social distancing*. Search the internet or talk with an adult to learn more about *social distancing*.
Social distancing is the practice of increasing the space between individuals and decreasing the frequency of contact to reduce the risk of spreading a disease (ideally to maintain at least 6 feet between all individuals, even those who have no symptoms).

What's the Point?

To track disease outbreaks, scientists (epidemiologists) work hard to identify the source of the disease, track who was exposed, and stop the spread of the disease. This is more difficult if the disease has a long incubation period, so people spread it without knowing they are infected. To keep a disease contained, it is important to keep infected persons from infecting others.

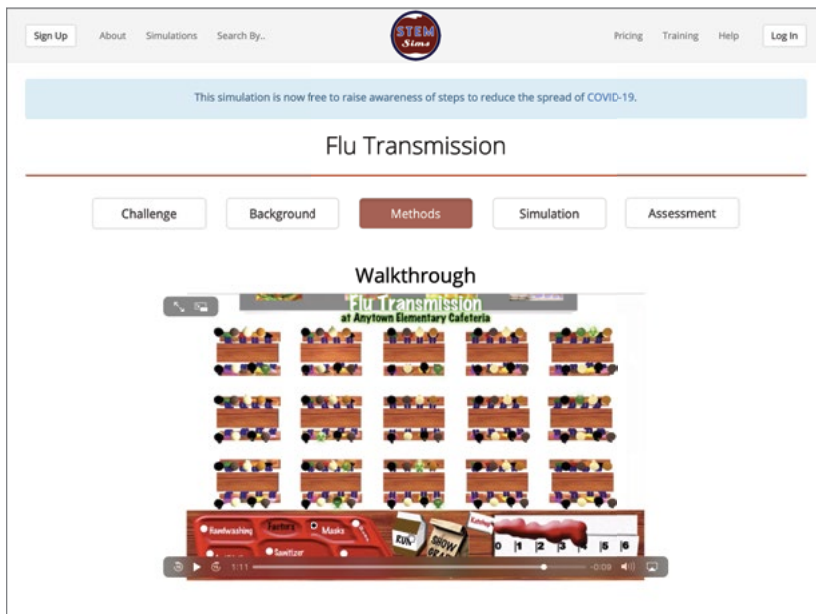
Simulating The Spread Of Flu

You may get an illness like the flu because one of your classmates infects you with the virus. What actions could a school take to contain the spread of the flu? In this simulation, you will see 6 factors that can affect how a virus spreads in the school cafeteria. “None” means nothing is done to stop the spread of the flu.

Test each factor in the *Flu Transmission Simulation* by choosing a factor then clicking on the milk carton to run the simulation. Observe how quickly the virus spreads among the students. Can you tell by watching which factor had the largest or

smallest effect on stopping the spread of flu? Click on the brown lunch sack to see a graph of all 6 factors. At the end of 6 weeks, which factor was the most effective at preventing the spread of the virus? Which was the least effective?

To start the simulation, click on the image below or visit stemsims.com and select the *Flu Transmission Simulation* on the home page. For more detailed instructions, click [here](#) or view the online tutorial in the Methods section.



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