Disease travels between individual organisms by a variety of methods. The disease organism assures its survival by adapting the means by which it can spread to other organisms. Some have very specific methods of transmission routes, while other spread using numerous methods like the common cold. The most common organisms that are pathogenic (disease causing) are bacteria and viruses. These organisms are responsible for pandemics. In this simulation a virus has invaded the human species. This virus is spread through airborne particles from an infected person. After completing the exercise you will first determine the rate of infection within your class, second using “contact tracing” methods determine which students brought the disease into your class, located patient(s) “zero” and third discuss/investigate the technology used in modern day disease testing.

Student Instructions

1. Each student should obtain a 1.5 ml tube containing 1 ml of solution and a small needle transfer pipet.

2. Exchange 2 drops of your solution with a classmate’s tube. Add 2 drops of your solution to a classmate’s then remove 2 drops from their tube and add it to yours. This represents a direct contact with an organism, diseased or not.

3. Repeat procedure 2 with two other students. When completed, you should have exchanged materials with three students in your class

4. The teacher will add several drops of test liquid to your tube to determine if you have contracted the disease. If your solution turns a pink/red color, you have been infected with the disease.

Analysis/Questions/Extensions

1. How many students in your class were infected?

2. Ask your teacher how many of the original tubes contained the infectious material. Calculate the rate of infection by dividing the number of infected students by the total number of students in class, then times 100. If you had 2 or more original tubes of infectious solution, divide your answer by that number.

3. Explain the rate of infection within the class as it relates to real disease.

4. How long would it take for this virus to infect your community at your class’s rate of infection?

5. Hypothesize what would happen with a fourth exchange of solutions?

6. Review your class data and see if you can come up with methods of contact tracing to determine which of your classmate’s started the “epidemic” or patient “zero.”

7. Research information on “what constitutes an epidemic?”
Each student should have a 1.5 ml tube of 1 ml of distilled water or a 1.5 ml tube containing the diseased solution.

Prepare one 1.5 ml tube per every 10 students with 1 ml of solution that contains the diseased solution, .1M NaOH. (4 grams of NaOH in 1 liter water)

Number the tubes including the infectious tubes for easy recognition.

Each student should always add their solution to another’s and then take from that student’s and add to their tube. This will show the lateral movement of the disease. Emphasize that the student will share biological material not just from the student they exchange with, but all the students they have had contact.

The indicator solution is phenolphthalein.

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