SBI 3C
J. Kropac

Biology of the Flu: Simulation

Over the course of the past 2,000 years, epidemics have had dramatic effects on human political and social history. The avian flu outbreak in 1918, also called the Spanish flu, was possibly the most devastating, short-duration epidemic in history. It killed an estimated 30-50 million people worldwide. Other epidemics include smallpox, human immunodeficiency virus (HIV), which causes acquired immune deficiency syndrome (AIDS), and severe acute respiratory syndrome (SARS). All of these epidemics are ***viral diseases***.

A crucial aspect of human epidemics is their link to epidemics occurring in animal populations. The viruses affecting the animals somehow make a transition to become transmissible from human to human. Two recent examples of viruses that made the jump from animals to humans are HIV (found in wild apes) and SARS (found in wild cats, bats, and ferrets). There is great concern among public health experts about the potential for another avian flu outbreak. Avian flu viruses live in the digestive tracts of birds. Virus particles are shed from bird feces, which can enter the human food chain via the water used to irrigate crops. Some avian flu viruses have the ability to combine with seasonal human flu viruses. Once this combination occurs, the viruses can spread easily from human to human.

To control an epidemic, public health professionals work closely with a range of specialists, such as ***epidemiologists*** (scientists who study the spread of diseases among animal and human populations), medical specialists, ***virologists***, and immunologists. Control of epidemics almost always consists of four types of preventive measures—***quarantine, immunization, mass education about prevention, and early and aggressive treatment of ill people***.

How does a deadly infectious disease like avian flu spread? In 1918, a flu virus swept the world, killing an estimated 30-50 million people. In a controversial move, scientists have recently revived this deadly virus in order to study it. It turns out that it's a lot like the avian flu virus that's cropping up in Asia. Researchers are hoping to understand this very contagious virus before it becomes able to infect large numbers of people. In this activity, you will model different ways that viruses spread through a population and what happens if inoculation is introduced.

Ground rules for today's simulation of how a virus spreads through a population:

1) In each round, move slowly, quietly, and calmly around the room.
2) If someone puts a sticker on your arm or hand, make sure it stays in place.
3) Don't actively avoid or seek out the virus carrier.

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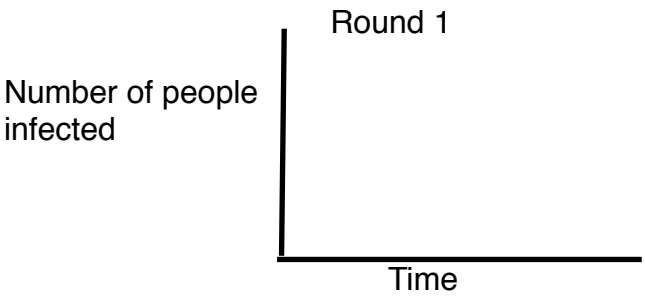
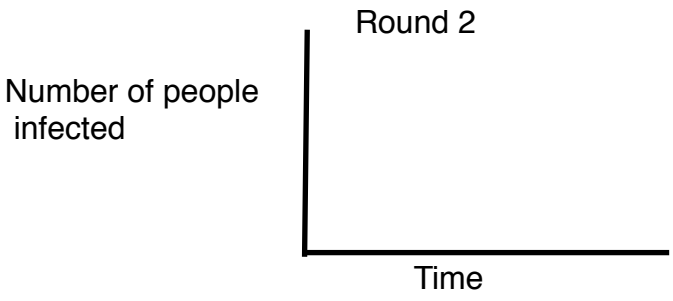
Data

Fill in the data table below.

	Game Round 1	Game Round 2
Number Infected		

On each axis, sketch a line to represent how quickly you think a virus would spread through a population if there were just one virus carrier infecting people (i.e., Round 1) versus multiple virus carriers (i.e., Round 2). Take your best guess at what the shapes of these lines would be.





Fill in the data table below.

Round	Percent Inoculated	Number Inoculated	Number Infected
2	0%		
3	20%		
4	40%		
5	60%		
6	80%		

Discussion

1) List some differences between Rounds 1 and 2.
2) Does Round 1 or 2 more closely approximate the spread of a real-life epidemic? Why?
3) How do different levels of inoculation affect how a virus spreads through a population?
4) List any methods that might help prevent an epidemic from spreading.
5) How do inoculations compare to other preventive measures, such as wearing a mask or washing hands, when it comes to reducing infections?