Vaccine effectiveness in real-time: an activity

Learning Objectives:

- Identify factors that make a population more or less susceptible to viral infection.
- Explain how vaccines can reduce viral spread in a population, even when not everyone is vaccinated.

Target audience:

Non-biology majors (a small lab or a large lecture will work—we often use this activity for a large lecture course), but can be used in 6-12 grade classrooms as well.

Supplies:

- soft ball to toss around a classroom (we bought this one on amazon)
- Several sheets of paper, and an envelope to hold them.

Prep before class:

- Ensure that the classroom is safe to throw objects in (this is not a good activity for a chemistry lab).
- Cut up papers into small squares (Should fit in a students' palm). You should have 1 piece for each student in your class (You can use the template below for a class of 24 or make your own following these specifications.
    - On the upper right corner of the piece of paper:
        - On 1/8 of the papers write "G" for "Grandparent"
        - On 1/8 of the papers write "B" for "Baby"
        - On the rest of the papers, write "HA" for "healthy adult."
    - On the lower left corner of the HA papers:
        - On 1/5 write "V" for "Vaccinated"

Classroom Activity

- Have students choose one piece of paper from the envelope and tell them they can look at it, but not to show anyone else, and then put this piece of paper in their pocket/otherwise hidden spot.
    - Have them put anything breakable into their backpacks or in an otherwise safe place.
        - Close water bottles, put away laptops, etc.
- Tell the student their roles, explaining that they should only look at the upper right corner (and that they may not have anything written in the bottom left). Putting these roles on the board or on a powerpoint slide may help.
- Explain to students that what you're tossing around is a virus, and that depending on your status (vaccinated or not), you will either become infected or prevent infection if you're vaccinated.

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- In the first round, students are vaccinated if their card has a “V” on it. Have students pass around the ball 20 times, the game stops if:
    - there are 10 consecutive infections (this is an epidemic, everyone dies)
    - there are 10 failed infections (the pathogen is eradicated, everyone lives)
- Due to the proportions of cards, the first round should cause an epidemic.
- The next round, say that all healthy adults are vaccinated, but babies and elderly are not vaccinated. Follow the same rules as the previous round.
    - This should result in the virus being eradicated from the population.

Discussion questions

1. How did the transmission of the virus change from round 1 to round 2? Did vaccination rate effect how this occurred?

2. Does increasing the vaccination rate only benefit vaccinated people? Why or why not?

3. How might you advocate for a young, healthy person in your life to get vaccinated, when they think they don’t need it because they’re young and healthy.

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G	G	G	B	HA	HA
B	B	HA V	HA V	HA V	HA
HA	HA	HA	HA	HA	HA
HA	HA	HA	HA	HA	HA

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