

Operation Outbreak Activity

October 22nd 2020

Presenter: Todd Brown: todd.brown@oursma.org

What is Operation Outbreak?

Operation Outbreak (OO) is a Bluetooth-based phone application that simulates how pathogens spread in a population and the impact of the interventions that can be taken. The curriculum and the phone app provide an immersive experience for students and real time information that can be used to better understand outbreak response and decision making for the future. Before SARS-CoV-2 was reported, Operation Outbreak was used to simulate a virus with similar features, correctly predicting many human behaviors later observed during this pandemic.

Examples of how to use in your classroom or school

- Within a school day, run the app from 90 minutes to half day and then convene for retrospective analysis such as tracking down 'patient zero,' where the outbreak began, calculating mortality, etc.
- Within a grade level or the entire school, run the app for 24-48 hours to test mitigation strategies such as, for example, wearing masks. You can vary parameters such as the transmission rate, the lethality rate, etc.
- All examples may utilize the supplemental curriculum for middle and high school students made available through the Operation Outbreak team, and soon to be available in downloadable form through operationoutbreak.org.

To learn more about OO:

- [Operation Outbreak website](#)
- [Operation Outbreak Shows What To Expect In A Pandemic](#)
- [A School Ran a Simulation of the Pandemic—Before the Pandemic](#)
- [When It Comes to Disease, Why Wait for a Pandemic to Respond?](#)
- [Could Math Beat Viruses like COVID-19? – National Geographic Society Newsroom](#)

Activity goals:

As you may have understood by now, the Operation Outbreak App requires in person interactions within range of Bluetooth capabilities to allow the simulation to run to its full potential. We won't be able to do this in today's seminar, however we will try, through the activity, to give you a sense of the topics and questions that the App can raise. We hope it will help you grasp the potential behind the use of the Operation Outbreak App and give you a sense of how you may use it in your classrooms (if you are teaching in person) or at home with your family.

In this activity, you will learn to:

- **Identify parameters influencing the progression and the outcome of a pandemic** and understanding how each parameter shapes this progression and outcome. By parameter we mean both biological and sociological.
- **Design an action plan to limit the spread of COVID-19** in a highschool set up with given constraints.

Overview of Today's Activity:

Activity Part I - Introduction to Operation Outbreak

- Time: 15 min
- Format: everyone together.

Activity Part II - The parameters influencing the progression of a pandemic

- Time: 15 min
- Format: in breakout rooms.

Activity Part III - Developing an Action Plan

- Time: 15 min
- Format: in breakout rooms.

Activity Part IV - Share your Action Plan

- Time: 15 min
- Format: everyone together



Activity Part I - Introduction to Operation Outbreak

Time: 15 min

Format: everyone together.

If you want to look at the slides from Todd's presentation after the activity, you can find them here: <https://lifesciencesoutreach.fas.harvard.edu/lecture-2-102220>

Activity Part II - The parameters influencing the progression of a pandemic.

Time: 15 min

Format: in breakout rooms.

	<p><u>Operation Outbreak App:</u> During the simulation of an outbreak with the application, students are faced with a pathogen that starts spreading in the school. One of the very first things that they will need to do is to think about the parameters that influence the spread of this pathogen. They must work together to stop the spread and save lives in real time using various tools to enhance understanding in biological sciences as well as governance.</p>
--	---

Question 1: (This should take you no more than 5 min)

In your breakout rooms, let's take the first step that you would have taken if you were running the simulation "in person": discuss and come up with a list of parameters influencing the progression of the COVID-19 pandemic. We encourage you to think beyond the "obvious ones" such as transmission rate, mortality rate, etc. Don't limit yourself to biological parameters and think sociological ones (i.e: how well does the population respect social distancing, level of trust of the population in their scientific and political authorities, etc. Think about what you learned during Caroline Buckee's lecture).



You can write your answers in the space below:

Question 2: From the list you came up with in **Question 1**, select the parameter you think is the most important. Answer Question 2-A, Question 2-B and Question 2-C for this parameter in the table below:



Parameter: _____

Question 2-A: Explain why you think this parameter is the most important one and how it might influence the COVID-19 pandemic (i.e. lack of vaccination will affect the potential of achieving herd immunity).

Question 2-B: What data may be necessary to better understand how this parameter is influencing the spread of COVID-19? How would one obtain such data?

Question 2-C: What, if anything, might be done to control this parameter?



Activity Part III - Developing an Action Plan:

Time: 15 min

Format: in breakout rooms.

 <p>OPERATION OUTBREAK</p>	<p>The Operation Outbreak app allows for unlimited scenarios to take place in a classroom or school: creating an experiential learning environment. The app parameters will be modified internally by the OO team to match the R naught, mortality rate, etc. based on the pathogen of choice by the teacher or school. The internal modification is due to safety concerns that have been expressed by federal law enforcement. The de-identified data collected from students during a simulation can illustrate ground truth (directly observed), transmission and superspreader events, and how decision-making can either proliferate or quell the spread of the pathogen within a given population over a specific time.</p>
---	--

Before moving on, decide on one person in your group to share your answers when you go back to the main room with everyone.

Devise a plan on how to best organize your high school to **allow in presence teaching but no spread of SARS-CoV-2**, given your assigned scenario. Include specific actions and explanations of how these actions would help control the disease. You are free to decide any other information that is not given.

- Breakout rooms 1, 2 & 3: Scenario 1.
- Breakout rooms 4, 5 & 6: Scenario 2.
- Breakout rooms 7, 8 & 9: Scenario 3.



Scenario 1: You are administrators in a school with 900 students and 100 staff members. COVID has begun to spread in your school beginning with positive cases:

1. Transportation: All the students are driven to school by their parents. The staff members are using their own cars.
2. Lunch: Lunch is served and eaten together in a cafeteria.
3. Sports: No sports practice is happening within the school.
4. Classes: The school is a typical U.S. high school built in the 1970s with academic departments (english, science, math, etc.) located in different wings of the school; students change classes every 50 minutes.
5. Testing: The school does not have any testing capacity.

Scenario 2: You are administrators in a school with 900 students and 100 staff members. COVID has begun to spread in your school beginning with positive cases:

1. Transportation: The students as well as the teachers are coming to school using public transportation.
2. Lunch: Lunch is provided in boxes that are picked up and eaten in classrooms.
3. Sports: Sport practice and competitions are happening within the school (no outside schools involved).
4. Classes: The school is a typical U.S. high school built in the 1970s with academic departments (english, science, math, etc.) located in different wings of the school; students change classes every 50 minutes.
5. Testing: The school can run 100 tests per week. The results are coming back within 3 days.

Scenario 3: You are administrators in a school with 900 students and 100 staff members. COVID has begun to spread in your school beginning with positive cases:

1. Transportation: A bus is collecting all the students. Teachers and staff are driving in their own cars.
2. Lunch: Boxed delivered and the lunch is eaten in a covered outdoor space.
3. Sports: The school teams compete within the district.



4. Classes: The school is a typical U.S. high school built in the 1970s with academic departments (english, science, math, etc.) located in different wings of the school. Students change classes every 50 minutes.
5. Testing: The school can run up to 1000 tests per week. The results are coming back within 3 days.

Activity Part IV - Share your Action Plan:

Time: 15 min

Format: everyone together.

 <p>OPERATION OUTBREAK</p>	<p><u>Operation Outbreak App:</u> These scenarios and action plans can be tested through the use of the app in various ways including testing the strategies themselves prior to implementation, as a pretest with the action plans themselves used as a post test. By using the app, teachers and participants can utilize data collected that will allow for direct observation of important events, and the behaviors that shape the results, while testing hypotheses specific to their class or school over a given time.</p>
---	---

A representative from randomly picked breakout rooms will have 1 min share their action plan. Make sure you quickly summarize the scenario that you were given to before you dive into explaining the action plan you developed.

