

# Zoomnosis

*a draft activity for teaching density vs. frequency-dependent transmission online*

BIOL 4559 Evolution and Ecology of Infectious Disease

September 15 2020

Amanda K Gibson

*Loosely inspired by Janis Antonovic's Class Photo Epidemiology Activity.*

This activity was specifically designed for Zoom and its breakout room feature. I did this at the start of class without giving the students any context. Students had read about density vs. frequency-dependent transmission in their out-of-class readings (e.g. Keeling and Rohani), but we hadn't formally covered it. Moving between different break-out rooms might not be strictly necessary, but it controls the outcome a bit better and is generally more entertaining and interactive.

## Objectives:

With this simulation activity, students:

- 1) Get introduced to density vs. frequency-dependent transmission, which will be explicitly covered later in class
- 2) Experience the context-dependent nature of transmission – realized transmission rate can vary with density of the host population
- 3) Draw comparisons between simulations to understand that transmission mode determines the sensitivity of transmission to host density.

## Rules

- 1) Students will need to have their view in Gallery mode
- 2) All students are susceptible, unless notified otherwise
- 3) There is no recovery – infected students remain infectious throughout the simulation
- 4) Only one round of transmission happens per breakout room
- 5) Follow the transmission rule

## Steps

Based upon a group of **40** students. Should be easy to modify.

*Variant 1: density-dependent transmission*

Transmission rule = an infected student transmits infection to all students with pictures that touch the infected student's, in the infected student's gallery view

1. In the main room, the instructor secretly alerts a subset of students that they're infected (I randomly chose 3 students and messaged them privately in the chat)
2. Instructor initiates **4 random breakout rooms of ~10 students each**
3. Students follow the transmission rule in the breakout rooms, with the three infected students alerting the students they touch that they are now infected. It's easiest to just verbally alert them rather than typing in the chat.
4. Shortly after all students enter breakout rooms, close them – set it so that breakout rooms close asap so students return immediately to the main room.

5. Recreate breakout rooms, creating 4 new random breakout rooms of ~10 students each.
6. Students follow the transmission rule again, completing one more round of transmission
7. Close breakout rooms
8. Use Zoom Polling to ask: Are you infected? Yes/No. Share results and enter results in excel sheet while sharing screen (see below)
9. Repeat steps 1-8, starting with a new group of 3 infected students. All other students return to fully susceptible. This time, breakout rooms contain ~2 people.

*Variant 2: frequency-dependent transmission*

Transmission rule = an infected student transmits infection to one student with a picture touching the infected student's, in the infected student's gallery view

Run steps 1-9 as above, following this new transmission rule. We didn't get to this second part, because the breakout rooms were set to close after a minute and it was too excruciating, but the students got the idea and seemed like they would have liked to do more rounds.

**Results**

I set this up in advance and, after polling, I filled in the I column while sharing my screen with the students.

