

# Day 17 Agent-Based Models - Superbugs

Nov. 12, 2020



# ABM and Superbugs

- ABM - create a "simple" set of rules and let the simulation run
- Superbugs - bacteria that evolve strong antibiotic resistance

## Next two class periods

- Develop a model of bacterial growth in a rectangular petridish with "stripes" of antibiotics
- **Today** - Create the "bugs" and the "world" and draw them both
- We will use OOP to do so

# Pre-Class

- What stub functions we should create?
- What should the classes look like?
- What attributes and methods should we have?

# Whole class brainstorming

## Classes (objects)

- class for the bacteria
- class to create the board/environment

## Attributes (values)

- chance of mutating
- resistance to antibiotics
- starting amount of bacteria
- location within dish
- amount of bacteria on the board for different segments
- amount of antibiotics on the board
- how evolved a bacterium is

## Methods (actions)

- clone function to create new bacteria
- way to find neighboring values in an array
- way to initialize antibiotics on the board
- way to update the board - new set of clones or taking in antibiotics
- a way to track the evolution of the bacteria
- a way to determine whether or not the bacteria can spread to certain area
- a way to kill the bacteria or have them multiply
- simulate mutations

Questions, Comments, Concerns?