# SIR

## Assumptions

Infected is not a spectrum. One can only be quantified in the state of infected or not infected.

This is needed in order to compartmentalize the model. Furthermore, ‘infected’ is a definite term and not vague.

There is a homogeneous mixing of people with and without XYZ. The SIR model assumes a homogeneous mixing of the ’infected’ group and the ’uninfected’ group.

Every person has the same probability of being infected, regardless of individual factors.

* In order to apply an SI model, we needed to standardize the factors used.

## Model Development

There are two primary methods by which people transition between susceptible to infection.

The first is a natural decay between the susceptible and infected group through people who

will just spontaneously reach the infected state. The second method occurs when the infected group infect the people from the susceptible group, and they join the infected group.

## Advantages

Our model is resilient to small changes and outputs sensible results

Changes in the model’s output due to shifts are consistent with expected trends as well. - link to real world

SIRS is also an established mathematical modeling technique that we adapted to fit our own aims, lending credence to the validity of our model

## Disadvantages

Based off past performance of growth, could be an unexpected surge in XYZ

## Sensitivity analysis

Change constants by 10% and see the output

# **Meyer Notes**

* We basically input in the initial distribution of infected/susceptible etc people
* We also input the various rates and stuff
* I input in the differential equations with the starting parameters and computer solves (Euler-Method) (using scipy’s odeint function)