

MODSIM PROJECT 3 CONCEPT SKETCH

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Question

The modeling question we are trying to answer is how infective does a disease have to be for masks to no longer be effective?

What modeling question will we choose to work towards answering? Why this question? What makes it interesting, and who might benefit from an answer?

We chose this question because not only is it building off of Project 1, it is also useful to know when masks would no longer be effective against a disease and other preventative measures might be needed. The people who would benefit from this answer are health officials responsible for spreading information and the general public who would want to know what is effective at preventing the spread of a disease.

How infective does a disease have to be for masks to become ineffective?

Model

How will we model our scenario of interest to answer our question? What assumptions and abstractions do we make? What are the states, parameters, and actions of our model? Which of these quantities are deterministic, and which are random? How are the random quantities distributed? How do we justify our choices? How will external research be useful to us?

► Include one or more visual representations of your model: a system boundary diagram, connectivity graph, etc.

We will use an agent based model with the transmission rate as our deterministic quantity and mask efficacy as our randomized quantity. The assumptions we are going to make is that everyone is equally likely to be infected by the virus and everyone is wearing their mask correctly. The states are susceptible, infected, and recovered, the parameters are the transmission rate and mask efficacy. The mask efficacy is based off what type of mask / if they are wearing a mask. Not everyone wears the same mask in real life. We will

do research on how effective different types of masks are.

- find data on mask efficacy distribution
- choose baseline ~~edge~~ edge weights for social connectivity and overlay mask efficacy onto that

a person is wearing



be clear on what's being randomized / the justification

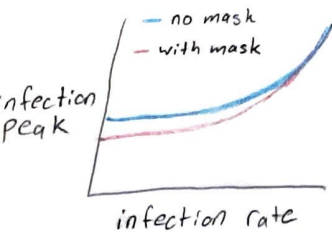


Connectivity: edge weights will be effected by the mask efficacy (these values will be randomized)

Results

When simulating our model, what output will we produce? What metric(s) will we compute to summarize this raw output? How will we deal with the effects of randomness in our model? What parameter sweep(s) will we perform? How will we validate our results? ► Include sketches of plots showing your hypotheses for the model output and any parameter sweeps. Don't forget to label your axes!

Output will be the number of infected individuals at each timestep we will compare results with and without masks with a parameter sweep over the infection rate (metric will be infection peak)



our hypothesis is that if a disease is infectious enough, masks will no longer be effective enough to lower infection peak

- pick a cut off # to decide mask effectiveness

validation we could find some studies/articles that look at the effectiveness of masks

Interpretation

How will we use these results to help answer our modeling question? What implications might this have in the real world for our stakeholders? ► Include at least one ABT statement stating your hypothesis for your outcome and its implications.

Many people use masks to protect themselves from disease. However, our model shows that if a disease is infectious enough, masks alone won't be enough to lower infections. Therefore, people should prepare other protective measures such as good hygiene and social distancing.

This interpretation would be useful for citizens and public health officials to know how to better protect themselves and the around them.