COVID-19 Simulator Module

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Overview

The following module uses the <u>COVID-19 Simulator</u> prepared by ISEE Systems in 2020.

Expectations

- Support all conclusions with evidence (graphs).
- Reference all graphs in your text.
- All graphs should be labeled and have detailed captions that include all of the parameters used.

Model Setup / Background

- 1. Click on Background Information. Read through each statement and click on the ? to the right of each statement for more information. Briefly summarize the background information.
- 2. Click on Model Overview. Even though this is called the Model Overview, they are also assumptions. Read through each model assumption and click on the ? to the right of each statement for more information. Briefly summarize the assumptions in the Model Overview section.
- 3. Click on Disease Assumptions. Click on Rest to Default Assumptions. Notice that this tab includes parameter values.
 - a. Look at each tab (Severity and Infectivity, Behavior, Duration, Mortality). Be sure to click the ? next to each assumption/parameter. List each parameter and describe why it is important in the model.
 - b. Look at the Infection Curve graph. What is on the x-axis? What is on the y-axis?
 - c. How many total people are there in Anytown? How do you know that from the graph? Why did the developers of the model choose to represent the data in this way?
 - d. How many stocks are there in the model? How do you know?
 - e. Using the graphs and the parameters, sketch out a possible stock & flow model of the system. You do not have to write the system of differential equations (unless you choose to do so).
 - f. Look at the Population Status graph. What is on the x-axis? What is on the y-axis? Why are there so many different numbers on the y-axis? What are the maximum number of presumed new infections (estimate)?
 - g. Look at the Cumulative Measures graph. What is on the x-axis? What is on the y-axis? Why are there so many different numbers on the y-axis? How many total people were tested by day 292?

Scenarios

- 1. Click on The COVID-19 Simulator title at the top of the page. Click on Do Nothing.
 - a. Go to Policies and Results. Describe why the parameter values listed represent 'Do Nothing'.
 - b. Describe what happens to the number of Sick individuals over time with the default parameters. When is the peak number of infected individuals? What is that peak?
 - c. Sketch a graph of the number of Healthy individuals over time. When is the number of Healthy individuals at a minimum? Why?
- 2. Click on The COVID-19 Simulator title at the top of the page. Click Effective Quarantine.
 - a. Go to Policies and Results. Describe why the parameter values listed represent 'Effective Quarantine'.
 - b. At the maximum, are there more people too ill to work or who need hospitalization? How do you know?
 - c. Sketch a graph of the number of individuals tested per day (you should use the Cumulative Measures graph to help you).
- 3. Click on The COVID-19 Simulator title at the top of the page. Click Additional Testing.
 - a. Go to Policies and Results. Describe why the parameter values listed represent 'Additional Testing'.
 - b. How many people were sick when the maximum number of people were sick? (You can and should interact with the graph. Be careful, the answer is not 90.8K.)
 - c. Sketch a graph of the total number of Recovered & Dead over time.
- 4. Click on The COVID-19 Simulator title at the top of the page. Click Containment.
 - a. Go to Policies and Results. Describe why the parameter values listed represent 'Containment'.
 - b. Explain why the Infection Curve looks the way that it does. Do you think this graph is an effective way to display the data? Why or why not.
 - c. Sketch a graph of the number of deaths tested per day (you should use the Cumulative Measures graph to help you).
- 5. Compare the outcomes from each four strategies. Support your conclusions below with graphs (that have clear captions and are referenced in your text).
 - a. How do the Infection Curves vary for each of the four strategies? Consider Hospitalized, Sick, Healthy, Dead, and Recovered.
 - b. How do the Population Status graphs vary for each of the four strategies? Specifically consider Too III to Work, and Needing Hospitalization.
 - c. How do the number of Cumulative Deaths, Hospital Bed Days, and Cumulative Testing vary for each of the four strategies?
 - d. What are the overall important takeaways from comparing the four strategies?

Multiple Strategies

- 1. Explore the impact of implementing different strategies. Your strategies should not have the same parameters as the four above. You can try a combination of strategies and/or select your own parameter values.
 - a. Describe your strategy.
 - b. Describe how you implemented your strategy (what parameter values did you use).
 - c. How did your strategy compare to the four strategies you explored above? You should include graphs that support your conclusions (that have captions and are referenced in your text).
 - d. How realistic is your strategy compared to the four strategies you explored above?
- 2. Click on the Summary Link. For each of the following conclusions, create graphs that support the conclusions.
 - a. Two weeks is not a long time.
 - b. Testing is really important.
 - c. The number of people that only get a little bit sick really matters.
 - d. Being contagious but not showing symptoms is bad.
 - e. A better quarantine does not always generate a preferable outcome.