

COSC150: Explorations in Pandemic Modeling with Vensim: Laboratory 5: 22 March

This is an exploration of a “generic” pathogen/virus/disease that is transmitted by human-to-human contact. It is not intended to replace actual medical advice for specific cases.

By the end of the lab explorations today, or on your own time, you will have:

- a) Built a simple Disease Model (Susceptible → Infected) producing a graph and a table
- b) Modified your simple Disease Model to add “social distance compliance”
- c) Modified your simple Disease Model to add Recovered, (save as...) to explore fuller SIR (Susceptible → Infected → Recovered) model in epidemiology
- d) Modified or downloaded pre-built model to add more realism (Exposure) producing SEIR model.

1. Follow the instructor to build a simple Disease Model. Record all steps needed to reproduce the procedure for any other model expressed as a difference (differential) equation or set of coupled equations. Include building/modifying a graph and a table.
2. Modify your simple model to include effect of “social distance compliance.” What is the main effect of compliance?
3. Save your model, then build or download:
<http://shodor.org/~rpanoff/COSC150/VensimModels/SIR.mdl> to add recovery
 - a. Develop some driving questions and
 - b. Use the model to investigate the answers
 - c. Record your observations
 - d. Reflect upon your observations
4. Download: <http://shodor.org/~rpanoff/COSC150/VensimModels/SEIR.mdl>
 - a. Write as complete a “story” as you can by examining the model.
 - b. Develop some driving questions and
 - c. Use the model to investigate the answers
 - d. What strategies could you use to minimize how the disease spreads?
 - e. Record your observations
 - f. Reflect upon your observations

General questions:

- a) How could you calibrate these models to “real world data”?
- b) How high does “social distance compliance” have to be to truly flatten the curve?
- c) How could you account for mutations in the pathogen?
- d) How would death or quarantine affect your models?