

# Modeling Virus Transmission with NetLogo using Agent Based and Systems Dynamics Modeling

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## Abstract

This project is to model the transmission dynamics of a virus based on user input. The goal of this project is to eventually be able to model the virus transmission dynamics of real situations, such as the 1918 Spanish Flu. Since there is a wealth of statistics about the 1918 Spanish Flu, the numbers can be recreated in the model

## Background

This project has two purposes, to create a virus model which accurately represents society, and to create a project integrating Systems Dynamics and Agent Based modeling. This model was based on a predator prey model done by Uri Wilensky in Northwestern University.

## Methods

The program is created using NetLogo, which has a GUI interface(See Fig-2). It displays the graphs the user defines and can show visually the patterns in the data. Testing of the program is done as soon as a new part is completed. Since the model is dynamically affected by every new parameter, the testing is an ongoing phase. The final test of the model will include actually modeling a real situation, so the results of the model will be compared against the real situation and see how close the model actually was to predicting a real outbreak. NetLogo includes a built in method called BehaviorSpace, which tracks the values of every variable and outputs it into a .csv file in excel. That can be used to plot and test whether the model works.

Fig-1 shows the flowchart for the Systems Dynamics model.

## Results

This will eventually contain the results of the model when run with the data from the 1918 Spanish Flu outbreak.

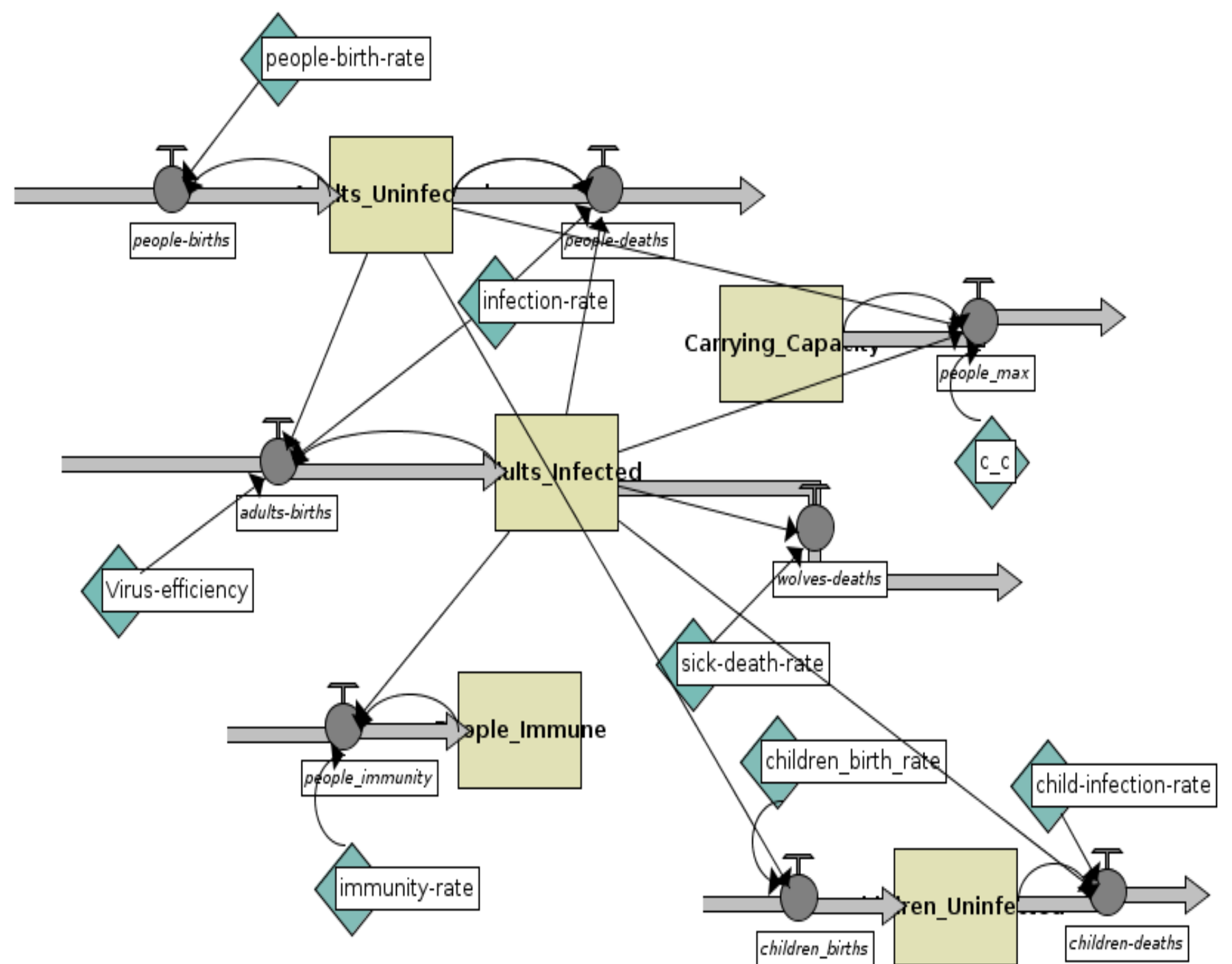


Fig-1

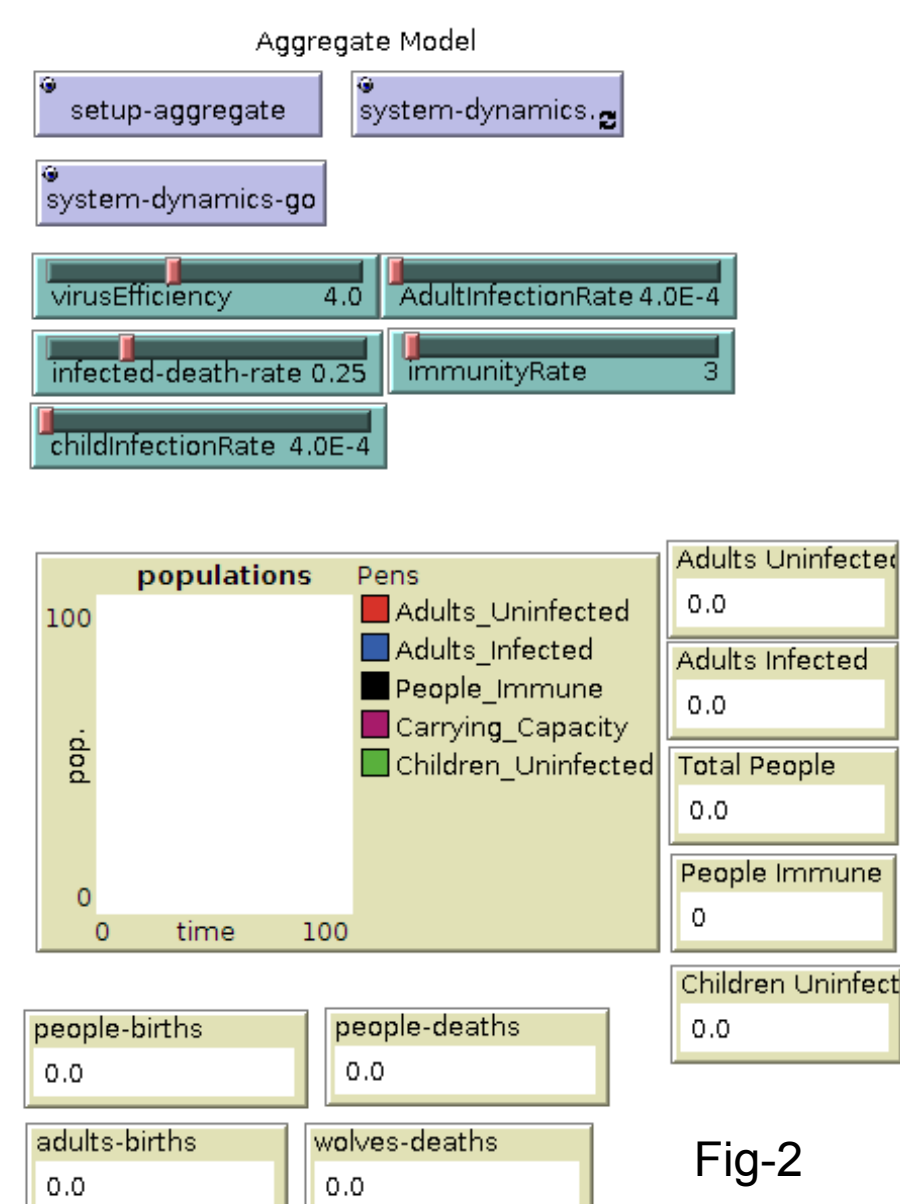


Fig-2