# Modeling Virus Transmission on Population Dynamics using Agent Based and Systems Dynamics Modeling

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## Abstract

This project is to model the effect of virus transmission dynamics on population based on user input. The goal of this project is to eventually be able to model the general trend in the way viruses affect populations in 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. The idea of integration is from research done by Schieritz et al. This model was based on a predator prey model done by Uri Wilensky in Northwestern University.

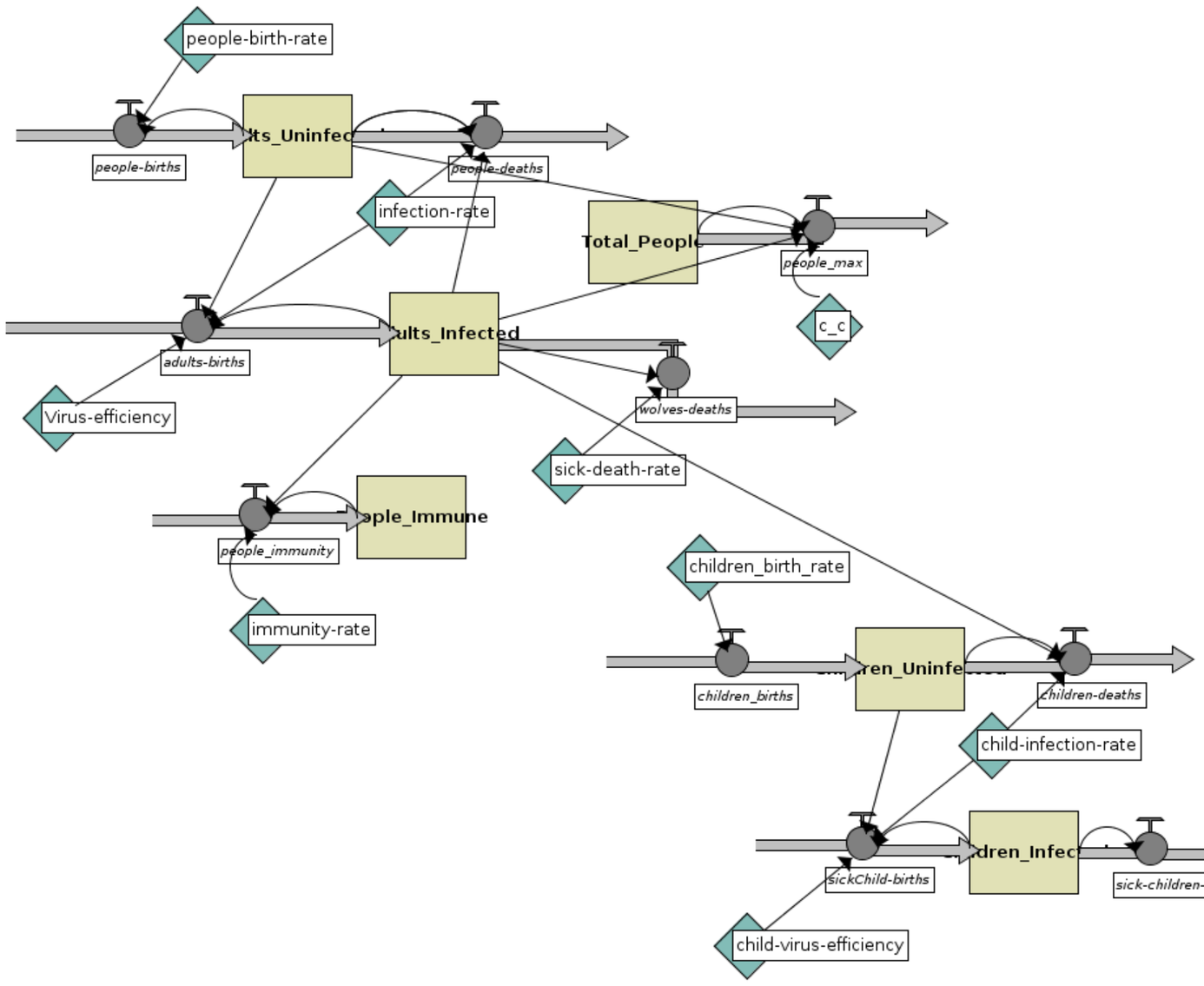


Fig-1

## Methods

As mentioned in Background, this model is created using NetLogo, a program which has a GUI interface(See Fig-2) for easy user access. It displays the graphs of the data the user defines and can show visually the patterns in the data. Testing of the model is done as soon as a new part is added. Since the model is dynamically affected by every new parameter, the testing is ongoing and is a main theme in my research. 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 which can be viewed in excel. That data can be used to plot and test whether the model works.
Fig-1 shows the flowchart for the Systems Dynamics model.
Fig-2 shows the central command center for the model.

## Results

This will eventually contain the results of the model when run with the data from the 1918 Spanish Flu outbreak. The general trend of the data will be in a oscillatory fashion, with an almost sinusoidal graph.