

AMSC/MATH 420, Spring 2015 Modeling Epidemics: Team Homework 2d

due Tuesday April 28

Please submit a preliminary outline of your final project report. It should include a description of the primary dependencies (see discussion below) you plan to explore and quantify in your remaining time, and a few illustrative numerical results.

The previous assignment gave a way to illustrate dependence of the optimal intervention strategy (according to impact function associated with the two-group SI model) on the relative cost between type a and type b interventions, given values of the transmission parameters $N_1, N_2, p_{11}, p_{12}, p_{21}, p_{22}$ and initial conditions, and a budget K_{\max} (for which we used a hypothetical value of 0.04 in the previous assignment).

Most teams are considering additional parameters for the cost function, impact function, intervention strategy, or intervention start time. Let's call the parameters a practitioner would not have control over – transmission parameters, cost function parameters, budget amount, and start time – the “scenario parameters”. A broad goal is to describe how the optimal intervention parameter values, and the impact they achieve, depend on the scenario parameter values. Each team project has a focus on different scenario parameters, so each team should concentrate primarily on describing the dependence on the scenario parameters specific to their project.

One way to quantify the dependence is to look for correlations between scenario parameter values and the intervention/impact values and develop a linear or otherwise simple model that relates at least some of these values. While a linear model that provides reasonable guidance can be valuable, a finding that no linear model fits the relationship well is also significant.

So far you have investigated intervention strategies for transmission parameter values fitted to two data sets, and as with past projects it's helpful to get a broader sense of how these parameters affect the results. Again, you can augment your scenarios using fits to other metropolitan areas in the same region as your assigned metropolitan area.