

## AMSC/MATH 420, Spring 2014

### First Project on Modeling Epidemics: Sensitivity of Parameters to Data

Oral presentation due Monday March 10

Written presentation due Friday March 14

Monthly data on AIDS diagnoses in various metropolitan areas (and the entire U.S.) is available at <http://wonder.cdc.gov/aids-v2002.html>. To download data for a particular city (and its metropolitan area), select “Month Diagnosed” in Section 1 next to “Group Results By”, and select the city name in Section 2. Then click any of the “Send” buttons. Once the data appears, you can save the data to a file with the “Export” button, but it may be just as easy to copy-and-paste. In addition to selecting data by region, you can select by demographic information, risk factors, etc.; for now, let’s stick to all diagnoses in a given region. From the monthly data, you can compute the cumulative number of diagnosed cases as a function of time.

Start by downloading monthly AIDS diagnoses data for the Detroit and San Francisco reporting areas. The goals of this project are to develop and test methods for fitting parameters of a modified SIR model (to be discussed further in class) to the data, and to determine how the parameters that “best” fit the data depend on the data itself; in particular, to quantify what the uncertainty in the parameters is for a given amount of uncertainty in the data. The uncertainty in the data may include both random fluctuations and systematic biases in reporting accuracy. The parameter sensitivity will depend on which city’s data you are using; start with the two cities above, and then look at some other cities in the north central U.S. to see how broadly your conclusions apply.