1106-VL-199 **Rachel Elizabeth TeWinkel*** (tewinke2@uwm.edu), UW-Milwaukee, Department of Mathematical Sci Rm E403, 3200 N Cramer St, Milwaukee, WI 53211-3029. *Epidemic Modeling with Optimal Controls in a Setting with Limited Resources and Spatial Dynamics.* Preliminary report.

A Susceptible-Infected-Recovered (SIR) epidemic model is presented with the assumption of there being limited resources for the mitigation of the epidemic. We discuss the optimal controls of vaccination and isolation on the system under the assumption that the vaccination does not offer perfect immunity. Simulation results show the possible effects of the optimal bang-bang controls as the epidemic progresses. A cellular automata (CA) model with similar assumptions is then described and similar simulations are produced with the addition of the spatial component. A comparison between the results of the SIR model and the CA model highlights the need for careful consideration of spatial dynamics and assumptions in these models. We show that there are cases where the simulations for the SIR model show significantly more individuals affected by the epidemic than the corresponding simulations for the CA model. We give a brief outline of how changing the assumption that isolation perfectly stops the spread of disease can change the outcome of the epidemic simulations in both the SIR model and the CA model. (Received September 16, 2014)