# Sofia Carrillo

## Cornell University


## Analyzing the Revolving Door: The Effects of Age on Hospital Readmission Rates

sec295@cornell.edu

Each year, the government incurs an estimated cost of seventeen billion dollars from preventable hospital readmissions for Medicare patients. In order to reduce unnecessary costs for both hospitals and the government, and to improve the quality of health care for patients, analysis of arrival, treatment, and departure rates of the hospital via the Erlang re-entrance model aids in determining the optimal length of stay for a patient. By testing different probability functions with hospital patient data in a MATLAB simulation, an optimal control, essentially the differential equations of variables that will minimize a hospital's cost function, determines the ideal amount of time a patient should stay in the hospital. Because different medical conditions affect varying age populations and have a fluctuating probability of readmission, the general model created allows input parameters from a specific disease, returning the optimal length of stay with respect to a patient's age and medical condition.

Because the model and programs created in this project are generalizable, the optimal length of stay for a patient of any age with any disease can be determined. With the current results, it is clear that once too many patients are entering a hospital, the levels of care are dramatically reduced, regardless of the age and condition of the patient. Thus, for only a short period of time, patients will receive better care, reducing their probability of readmission. As such, the effects of age on hospital readmissions become negligible when too many patients are entering the hospital, resulting in a standardized level of poorer treatment and higher probabilities of readmission.