Simulation of Patient Flow and Healthcare Resources in a Hospital

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Abstract

In this simulation study, we simulate patient arrivals and their flow within a hospital with the objective of improving patient waiting times and effective usage of health care resources such as nurses, physicians and other healthcare personnel. Our simulation model includes the following departments of the hospital: Registration, Triage, Emergency department, X-ray, Labs, Clinics, and the Surgery department. We first collect the arrival data, map out the processes in each department, and collect processing time data for each operation. We also determine the type and number of nurses, physicians, their alternates needed to perform each operation. In our simulation study, we first simulate the current situation in the hospital and establish a baseline for several key performance indicators such as waiting time, number of patients served, nurse and physician utilization. As an improvement attempt, we develop several scenarios which focus on resource sharing among several departments, changing staffing levels of departments during the day based on patient traffic and provide recommendations to the hospital management.

Keywords
Healthcare, simulation, hospital simulation, scheduling

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