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## **Discrete Event Simulation Analysis of Patient Flows from Emergency Department and Operating Room to Inpatient Units**

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**Abstract:** Inefficient inpatient flow management leads to overcrowding and patients have to wait for a long period of time in emergency departments (EDs). It consequently causes a critical issue that delays ED patients admitted to inpatient units (IUs), known as ED holds. Patients from operating rooms (ORs) are also admitted to IUs. Hence, there are often a large number of inpatients concurrently admitted from ED and OR to IU in a hospital. It is very important to reduce the delay of patient flow process because of its strong correlation with patient satisfaction, staff satisfaction, safety, and profit margins. In this study, we develop a patient flow model using discrete event simulation based on the actual statistics of a partner hospital. The objective of this study is to investigate patient flows by reducing the number of ED holds and redesigning OR scheduling simultaneously. The experimental results show that ED holds can be reduced up to 20% in our redesigned OR schedules based on inpatient bed discharge patterns.

*Keywords:* Discrete event simulation, emergency department, operating room, inpatient bed, inpatient flow management