# Using Discrete Event Simulation to Improve the Patient Flow of A Healthcare System

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## Abstract

Long waiting time in any process is a challenge for any healthcare system. As healthcare institutions are complex and busy system and various department interacts with each other any existing bottleneck can drive the whole system into failure in providing in-time services. And that raises the need to use simulation to detect and eliminate the bottleneck faced in any process. In this paper, a model based on simulation aiming at patient flow optimization in a healthcare system has been proposed. To achieve the goal, first, modeling of patients' workflow was created by using discrete-event simulation using Rockwell Arena Software. Afterward, alternative scenarios were analyzed in the process analysis to identify the best scenarios. Among defined scenarios, the Analytical Hierarchy Process method (AHP) scores the highest value to the most suitable one. The simulation results indicate that performing this scenario can decrease non served patient number to almost zero by adding two resources while eliminating one. To get the maximum utilization of the resources at the end resource scheduling is presented.

## Keywords

Discrete event simulation, Patient flow, Resource scheduling, Process analyzer and Analytical hierarchy process.