

Discrete-Event Simulation for Performance Evaluation and Improvement of Gynecology Outpatient Departments: A Case Study in the Public Sector

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Abstract

Gynecology outpatient units are in charge of treating different gynecological diseases such as tumorous, cancer, urinary incontinence, gynecological pain, and abnormal discharge. On-time attention is thus needed to avoid severe complications, patient dissatisfaction, and elevated healthcare costs. There is then an urgent need for assessing whether the gynecology outpatient departments are cost-effective and what interventions are required for improving clinical outcomes. Despite this context, the studies directly concentrating on diagnosis and improvement of these departments are widely limited. To address these concerns, this paper aims to provide a Discrete-event Simulation (DES) modelling framework to help healthcare managers gain a better understanding of the gynecology outpatient services and evaluate improvement strategies. First, the patient journey through the gynecology outpatient service is mapped. To correctly represent the system uncertainty, collected data is then processed through input analysis. Third, the data is used to model and simulate the real gynecology outpatient unit. This model is later validated to determine whether it is statistically equivalent to the real system. After this, using performance metrics derived from the simulation model, the gynecology outpatient department is analyzed to identify potential improvements. We finally pretest potential interventions to define their viability during implementation. A case study of a mixed-patient type environment in a public gynecology outpatient unit is presented to verify the applicability of the proposed methodology. The results evidenced that appointment lead times could be efficiently reduced using this approach. © 2019, Springer Nature Switzerland AG.

Keywords:

Appointment lead-time, Discrete-event simulation (DES), Gynecology, Healthcare, Outpatient care