A Discrete Event Simulation Model to Manage Bed Usage for Non-Elective Admissions in a Geriatric Medicine Speciality

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Abstract : Over the past decade, the non-elective admissions in the UK have increased significantly. Taking into account limited resources (i.e. beds), the related service managers are obliged to manage their resources effectively due to the non-elective admissions which are mostly admitted to inpatient specialities via A&E departments. Geriatric medicine is one of specialities that have long length of stay for the non-elective admissions. This study aims to develop a discrete event simulation model to understand how possible increases on non-elective demand over the next 12 months affect the bed occupancy rate and to determine required number of beds in a geriatric medicine speciality in a UK hospital. In our validated simulation model, we take into account observed frequency distributions which are derived from a big data covering the period April, 2009 to January, 2013, for the non-elective admission and the length of stay. An experimental analysis, which consists of 16 experiments, is carried out to better understand possible effects of case studies and scenarios related to increase on demand and number of bed. As a result, the speciality does not achieve the target level in the base model although the bed occupancy rate decreases from 125.94% to 96.41% by increasing the number of beds by 30%. In addition, the number of required beds is more than the number of beds considered in the scenario analysis in order to meet the bed requirement. This paper sheds light on bed management for service managers in geriatric medicine specialities.

Keywords : bed management, bed occupancy rate, discrete event simulation, geriatric medicine, non-elective admission
Conference Title : ICMS 2018 : International Conference on Modeling and Simulation
Conference Location : Paris, France
Conference Dates : March 15-16, 2018