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Resources improvement in emergency department using simulation and data envelopment analysis
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Abstract

The Emergency Department of Universiti Kebangsaan Medical Centre (PPUKM) receives a high number of patients daily resulted in numerous problems particularly overcrowding. Therefore, this study is designed to identify the best optimization model that improve resources in order to improve the efficiency level of the PPUKM Emergency Department and solve the overcrowding problem. Simulation technique is used to build a simulation model of the emergency department where the variables used in the model are specified by triage zones or treatment areas. The proposed alternative improvements contains a new configuration of department resources. Six combined models used are the CCR Model and Reference Set, BCC Model and Reference Set, CCR Model and Super-Efficiency, BCC Model and Super-Efficiency, Bi-Objective MCDEA-CCR Model and Cross-Efficiency and Bi-Objective MCDEA-BCC Model and Cross Efficiency. Bi-Objective MCDEA-BCC Model is a continuation of Bi-Objective MCDEA-CCR Model from previous studies. The results showed that the Bi-Objective MCDEA-BCC Model has derived the least number of efficient alternative improvements compared to other combined models. It also suggested an optimum alternative that can reduce the patient waiting time in the Green Zone by 51% while the percentage of resource utilisation has been improved to be more reasonable. This alternative needs redesigning the department's resources without making major changes to the original system. © 2018 Penerbit Universiti Kebangsaan Malaysia. All rights reserved.

Author Keywords

Data Envelopment Analysis; Emergency department; Overcrowding; Resource optimisation; Simulation

Index Keywords

computer simulation, data envelopment analysis, hazard assessment, hospital sector, optimization, overcrowding, resource management

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