

## Accepted Manuscript

A stochastic model to minimize patient waiting time in an emergency department

Dorsaf Daldoul, Issam Nouaouri, Hanen Bouchriha, Hamid Allaoui

PII: S2211-6923(16)30129-1  
DOI: <https://doi.org/10.1016/j.orhc.2018.01.008>  
Reference: ORHC 154

To appear in: *Operations Research for Health Care*

Received date : 1 November 2016

Accepted date : 30 January 2018

Please cite this article as: D. Daldoul, I. Nouaouri, H. Bouchriha, H. Allaoui, A stochastic model to minimize patient waiting time in an emergency department, *Operations Research for Health Care* (2018), <https://doi.org/10.1016/j.orhc.2018.01.008>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



## A stochastic model to minimize patient waiting time in an emergency department

Dorsaf Daldoul<sup>1,2\*</sup>, Issam Nouaouri<sup>2</sup>, Hanen Bouchriha<sup>1</sup>, and Hamid Allaoui<sup>2</sup>

**Abstract** The hospital emergency department (ED), which constitutes a complex system with random demands, is the primary facility for urgent health issues. Overcrowding and the limited resources affect the waiting time of patients in the ED. In this research, we model the healthcare services in the ED of a university hospital in Tunisia. We consider simultaneously six patient queues. The goal is to optimize the human and material resources required to reduce the average total patient waiting time. We focus particularly on the medical staff (physicians and nurses) and beds in the ED. We propose a stochastic mixed-integer programming model, which can be solved by a sample average approximation approach. Here, we use the solver ILOG CPLEX Optimization Studio. We compare the performance obtained from the optimization model with what exists currently in the ED under consideration. The results of the experimental study demonstrate that the proposed approach improves the average total patient waiting time by up to 23.24%.

**Keywords:** emergency department, waiting time, stochastic programming, sample average approximation, resource allocation

---

\* Corresponding author

*E-mail address:* daldouldorsaf@yahoo.fr

<sup>1</sup> National Engineering School of Tunis, LR11ES20 LACS Laboratory, University of Tunis Elmanar  
1002 Tunis, Tunisia

<sup>2</sup> University of Artois, LGI2A Laboratory 62400 Bethune, France

Download English Version:

<https://daneshyari.com/en/article/7543521>

Download Persian Version:

<https://daneshyari.com/article/7543521>

[Daneshyari.com](https://daneshyari.com)