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Disaster preparedness in hospitals: sizing critical resources[*]

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Abstract

In case of a disaster, hospitals must be able to receive all injured persons for medical and surgical treatments. Therefore, the involved health care facilities should be well designed to prevent hospitals from becoming overwhelmed. In this paper, we deal with the preparation phase of the disaster management plan. We focus on the sizing activity of emergency resources and more precisely operating rooms and medical staffs. So, we propose two integer linear programming models. The first model provides the optimal number of operating rooms that best respond to mass casualty events such that all victims are treated. The second model enables to determine the latest ready dates of surgical staffs so as the optimal sizing is maintained. Computational experiments performed by the Cplex solver show that a substantial aid is proposed by using these models in hospital disaster management.

Key words: Integer programming, Disaster preparedness, Sizing, critical resources.

1. Introduction

A disaster situation is defined as a serious disruption of a society that involves a big number of victims (*e.g.* terrorist attack, road accident, air crash, earthquake, and hurricane). Such an incident, affects hospitals of all sizes and geographic locations. In fact, the need for medical and surgical treatments overwhelms hospitals' capabilities with respect to standard operating procedures. For that reason, different countries require that their

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