Chapter 6
Capacity Decision in Emergency Hospital Operation Rooms:
Sizing Using Simulation

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ABSTRACT

The operations management is a multidisciplinary field that investigates, for instance, the design, management and processes improvement focused on the development, production, distribution and delivery of products and services, encompassing activities such as the implementation of policies, making quota decisions, identification and problem solving, response to uncertainty, among others. Regarding the resources dimensioning in hospitals, the Brazilian scenario is limited to legislative instruments that assume a prior and added sizing. This chapter uses a discrete event simulation tool to set the amount of operation rooms needed for patient care in an emergency department, so that emergency patients have guaranteed compliance, minimizing the cancellation of elective surgeries because of this type of demand. As a result, it was found that the minimum amount established by normative instruments was not appropriate to the specific requirements of the organization.

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INTRODUCTION

In Brazil, as a constitutional principle, people have the right to health, which is a State duty, without limits (BRASIL, 1988). However, even considering the pertinence of this universal right, pragmatic differences and difficulties arise when the origins of the resources needed to support this right are questioned or not (TIEGHI, 2013). As defined by Hollnagel et al. (2013: 59), health care is "an open, extensive and widely effective system characterized by large numbers of people, emerging and adaptive behaviors over time."

In this context, designing healthcare operations refers to a complex object, which includes, for example, making decisions about the size of the health unit and its location, which healthcare flows will be made available, what is the stock policy of hospital materials, which IT system to implement according to the regulatory apparatus, among others (SPIEGEL & CAMEIRA, 2016). The healthcare operations management refers to decisions and actions that occur within the limits defined by the operating system design. These include activities such as the implementation of policies, procedures and strategies, contingent decision-making, process coordination, problem identification and resolution, response to uncertainty and unforeseen problems, and rewarding people (SPIEGEL et al, 2016). Improving the system refers to experimentation and learning activities aimed to improve operational performance over time (GINO & PISANO, 2008: 6). In some particular cases, such as emergency hospital units, the system is subject to demand peaks triggered by external and therefore uncontrollable events, where each patient presents a unique set of needs (Smith et al. 2007). Thus, this system needs to be designed to deal with variability in a scenario where there is an incompatibility between the investments and their potential demand (HALL, 2013).

About the hospital units resources dimensioning, the Brazilian scenario is defined mainly by the Resolution of the Board of Directors (RDC) nº 50/2002, which, in the context of an emergency unit, for example, defines as minimum number of operating rooms intended for the emergency patients care (polytrauma, cardiac arrest, among others) only one room. The sizing imposed by normative instruments assumes a fixed and aggregate demand, without considering the variabilities and specificities of the unit in question (demand profile, characteristic of professionals working in the unit, availability of resources in real time, among others) (SPIEGEL & ASSAD, 2016). Although on a propositional bias, SOMASUS (2011) points out the need for both polytrauma and emergency rooms to be sized to serve at least two patients at the same time. To tackle this inconsistency, this article proposes to use a Discrete Event Simulation Tool to analyze the trade-offs between different emergency rooms availability policies, in order to subsidize the decision-making about the configuration of an operation theater. The choice of this tool is due to its