

Chapter 45

An Operating Theater Planning Decision Support System

Carlos Gomes

Universidade do Porto, Portugal

Fabício Sperandio

Universidade do Porto, Portugal

Arnon Peles

Ben-Gurion University of the Negev, Israel

José Borges

Universidade do Porto, Portugal

António Carvalho Brito

Universidade do Porto, Portugal

Bernardo Almada-Lobo

Universidade do Porto, Portugal

ABSTRACT

The operating theater is the biggest hospital budget expenditure. The usage of surgery related resources and its intrinsic planning must be carefully devised in order to achieve better operational performance. However, from long to short term planning, the decision processes inherent to the operating theater are often the subject of empiricism. Moreover, the current hospital information systems available in Portuguese public hospitals lack a decision support system component, which could assist in achieving better planning solutions. This work reports the development of a centralized system for the operating theater planning to support decision-making tasks of surgeons, chief specialty managers, and hospital administration. Its main components concern surgery scheduling, operating theater's resource allocation and performance measurement. The enhancement of the planning processes, the increase of policy compliance, and the overall performance of the operating theater compared to the former methodologies are also discussed.

1. INTRODUCTION

The technological advances, medical breakthroughs, better, and more efficient services have improved the human quality of life and expectancy, leading to a new paradigm for the health care service providers. Hospitals are now able to assist patients who were once unable to receive adequate treatment due to the lack of knowledge

and means; this fact along with the ageing population is increasing the demand and the pressure on health care providers to maintain service levels and quality. Patients often experience serious delays due to the highly variable patient requirements or capacity constraints, which hospitals are unable to increase due to cost pressures, regulatory constraints, or shortage of appropriate personnel (Green, 2005). Generally, the gap between offer

DOI: 10.4018/978-1-4666-6339-8.ch045

and demand leads to long waiting lists for treatment, a worldwide social problem that is recurrently observed in hospitals. The long waiting lists arise from different causes such as:

- Public hospital preference over private;
- Insufficient government funding;
- Doctors' decisions and consequent efficiency;
- Patients' attitudes (punctuality, cancellations and no-shows); and also
- The uncertain nature of the health care processes (*e.g.*, treatment durations and outcomes).

Many of the measures taken by governments and hospital organizations to tackle the waiting lists problem involve promoting overtime work in order to increase the available capacity; however, it carries a heavy financial cost in the long-run. As healthcare service providers face budget cuts due to the current economic context, the new paradigm demands them to do more and better with less. In this context, business process and continuous improvement methodologies emerge as strong frameworks in the search for a more efficient utilization of the available resources, empowering healthcare organizations to cope with the increased demand.

The operating theater is considered the hospital's largest budget consumption segment and an important example of long waiting times for treatment in hospitals (Green, 2005). This work aims at improving decision making processes at the operating theater as a mean to increase performance within hospitals. This project is also motivated by the immediate attention that patients waiting for surgery naturally require and the importance given by governments to reduce waiting times for surgery. In addition, a relevant Portuguese public general admission hospital served as a case study; where it was noticed that the decision making processes within the operating theater were often empiric. Moreover, the existing health information

system in the Portuguese public health system lacks a decision support component that could standardize the procedures. As an example, the surgery schedule planning methods observed in the case study included: (1) paper-based maps; (2) spreadsheets; and (3) online calendars; reducing the centralization to insignificant levels since these methods are personal and not transversal to a group or a specialty department. The general Portuguese public health situation related to the operating theater depicts well the problem. At the end of 2010, 161.000 patients were waiting for surgery, of which almost 15% had waited for over 12 months, and the patients operated had a median waiting time for surgery of 3.3 months (SIGIC, 2011). These statistics explain the low ranking of Portugal on a Swedish study (Bjornberg & Cebolla, 2009), that recognized Portuguese health care services as number 21 among 33 European countries, mainly due to its long waiting times for treatment. It is important to note that other countries have to face similar issues. The OECD (Organisation for Economic Co-operation and Development) reports, for instance, that Italy and Norway recently had over 25% of their surgical cases waiting more than 3 months (Siciliani & Hurs, 2004).

In order to contribute to solve this issue, a Decision Support System (DSS) for the operating theater was developed, supporting decision-making tasks of surgeons, chief specialty managers and hospital administration. In particular, the DSS was tailored for the processes of surgery scheduling, operating theater's resource allocation and performance measurement. The main considerations taken into account were to respect patients' rights and to use critical resources more efficiently; moreover, the DSS was designed envisioning a centralized and patient oriented planning platform, built to enhance communication, coordination, and performance in the operating theater.

The remainder of the paper is as follows. In Section 2 a comprehensive literature review will be given, with special emphasis on operating

16 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:
www.igi-global.com/chapter/an-operating-theater-planning-decision-support-system/116252

Related Content

Hospital Environment Scenarios using WLAN over OPNET Simulation Tool

Nurul I. Sarkar, Anita Xiao-min Kuang, Kashif Nisar and Angela Amphawan (2015). *Healthcare Administration: Concepts, Methodologies, Tools, and Applications* (pp. 789-804).

www.irma-international.org/chapter/hospital-environment-scenarios-using-wlan-over-opnet-simulation-tool/116246

The Impact of the Attitude of Medical Staff From Burnout on the Level of Ongoing Medical Services

Anita Wójcik (2018). *Healthcare Administration for Patient Safety and Engagement* (pp. 47-73).

www.irma-international.org/chapter/the-impact-of-the-attitude-of-medical-staff-from-burnout-on-the-level-of-ongoing-medical-services/197554

How Social Media Contribute to Autists' Wellbeing: A Netnographic Analysis of Virtual Communities Content

Wiliam Ramalho Feitosa, Daniela Silveira and Leticia Prado Andrade (2021). *Management and Marketing for Improved Competitiveness and Performance in the Healthcare Sector* (pp. 188-212).

www.irma-international.org/chapter/how-social-media-contribute-to-autists-wellbeing/285807

Operating Room Management in Health Care: Operations Research and Artificial Intelligence Approaches

Irem Ozkarahan, Emrah B. Edis and Pinar Mizrak Ozfirat (2015). *Healthcare Administration: Concepts, Methodologies, Tools, and Applications* (pp. 847-867).

www.irma-international.org/chapter/operating-room-management-in-health-care/116251

The Role of E-Health in Total Quality Management

Yesim Can Saglam (2023). *Handbook of Research on Quality and Competitiveness in the Healthcare Services Sector* (pp. 364-378).

www.irma-international.org/chapter/the-role-of-e-health-in-total-quality-management/320860