Measuring the Effects of Information Systems on the Performance of Operating Rooms (OR)

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ABSTRACT

The paper applies various qualitative and quantitative methods to measure the influence of information technology on the performance of operating rooms (ORs). It provides a comprehensive set of indicators to evaluate the impact of IT on the quality, efficiency and performance of ORs. This set of indicators was further enriched by conducting interviews with hospital professionals. The result is a new set of performance indicators, divided into five major categories: productivity, efficiency, quality, cost savings and employee satisfaction. This set of indicators serves as a basis for a weighed performance model that can be applied as a useful tool for selecting new OR information systems. Additionally, the model can be used for improving existing applications. The research identifies time registration, integration with the medical and financial systems of the hospital and production of activity queries and reports as the most common functions of ORs systems. However, despite their potential to contribute to productivity, efficiency and quality of ORs, automatic conflict recognition, material and personnel planning are less frequently applied by hospitals. Finally, the paper highlights the links between efficient use of OR systems, larger volumes of operations and higher occupation rates, and assists in identifying positive effects of systems used in ORs on their performance.

Keywords: Indicators, Measurement, Operating Rooms, Performance

1 INTRODUCTION

The importance of measuring hospital performance has been highlighted during the last few years in response to major changes and studies on the quality of medical services and the perception of the individual patient within the medical system (Eisler et al., 2006; Baltussen et al., 2005). Responsibility of healthcare services to medical practices that they assign and transparency to public assessment of their performance are increasingly emphasized as policy makers increasingly expand the role of market oriented and liberal policies that enable patients to choose their hospitals and surgeons. As a result, measurements of performance and
service quality of hospitals and medical units have become major inputs in the decisions made by hospitals, patients and insurers, however, their precise measurement and evaluation is hardly straightforward.

In 2004, the Dutch Ministry of Healthcare commissioned a study on patient logistics in the Dutch healthcare sector that was carried out by the Dutch Postal Office (TPG). TPG was chosen to carry out this research on the basis of its knowledge in logistics processes and development of solid delivery systems. The results, published in the report “Faster, Better” (TPG, 2004), reveal two important bottlenecks in the patient logistics: First, patients are pushed into the medical system according to urgency and available capacity in hospitals. Consequently, the medical system functions as a black box, whose aim is to balance the capacities of medical facilities, rather than placing the patients at the center of the process of examination and treatment. Further, in many hospitals employees cannot predict the workload and do not receive clear measures of treatment times. As a result, it became more difficult to manage hospital processes and the waiting times of patients increase.

Second, hardly positive stimuli exist for improving the process or for shortening the duration of treatments (Spil et al., 2009). In the current healthcare system hospitals do not receive incentives for improving their patient logistics and efficiency, as budgets, maximal costs and the annual number of operations is determined by the government. Consequently, hospitals that perform fewer operations receive lower funding (Helms et al., 2008). However, when a hospital increases the number of operations beyond the agreed quota, it does not necessarily receive a larger budget, despite the proportional increase in its costs. The report indicates that dramatic improvements in patient logistics, in terms of efficiency, treatment quality and expenditure, can be achieved through redesigning processes and incorporating three types of IT systems: (1) patient information databases, (2) planning systems and (3) management information systems. Further, those systems can be applied to measure the performance of hospitals and can provide necessary inputs to managers and to financial planners. TPG estimates maximal efficiency gains of 25% by applying those changes. Operating rooms (ORs) have an essential function and a pivotal role within the medical system, as well as in every hospital. Their provision of a wide breadth of services to virtually every medical department highlights their significance within hospitals as well as within the broader context of national and regional healthcare services. From the medical perspective, effective planning and management of ORs is therefore essential in providing high quality of treatment, maintaining flexibility in cases of unexpected urgencies or elongated operations and in preventing bottlenecks in treating patients. On the financial and administrative side, efficient OR planning increases the productivity of hospital facilities and reduces the initial costs of constructing additional ORs and the costs of operating them.

Increasing numbers of hospitals have implemented OR information systems to improve the planning of OR usage by providing their workers with software tools that manage the schedule of OR personnel and facilities. Notably, those applications collect data on a variety of operations to assist in anticipating the duration of similar medical practices (which is necessary for planning and scheduling operations) and to evaluate efficiency, productivity, quality and expenditure of OR units. For this purpose, OR-planning involves gathering information on patients, beds, ORs, anaesthesia, surgeons, materials and deriving from them operational decisions (e.g. time schedule of surgeons and ORs) and at higher managerial levels, indicators that measure the performance of the unit. As OR information systems cluster data on patients and on treatments, they increase the predictability of operations and their durations. Certain operations can be standardized and executed according to the best practice and the logistic processes that accompany them can also be standardized. The planning can be improved by calculating throughput times and anticipating the demand on the basis of the augmented data.
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