

Clinical Science

Successful interventions to reduce first-case tardiness in Dutch university medical centers: Results of a nationwide operating room benchmark study



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Economic impact;
Performance indicators;
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Abstract

BACKGROUND: First-case tardiness is still a common source of frustration. In this study, a nationwide operating room (OR) Benchmark database was used to assess the effectiveness of interventions implemented to reduce tardiness and calculate its economic impact.

METHODS: Data from 8 University Medical Centers over 7 years were included: 190,295 elective inpatient first cases. Data were analyzed with SPSS statistics and multidisciplinary focus-group study meetings. Analysis of variance with contrast analysis measured the influence of interventions.

RESULTS: Seven thousand ninety-four hours were lost annually to first-case tardiness, which has a considerable economic impact. Four University Medical Centers implemented interventions and effectuated a significant reduction in tardiness, eg providing feedbacks directly when ORs started too late, new agreements between OR and intensive care unit departments concerning “intensive care unit bed release” policy, and a shift in responsibilities regarding transport of patients to the OR.

CONCLUSIONS: Nationwide benchmarking can be applied to identify and measure the effectiveness of interventions to reduce first-case tardiness in a university hospital OR environment. The implemented interventions in 4 centers were successful in significantly reducing first-case tardiness.

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Operating rooms (ORs) are of paramount importance to a hospital, given the fact that more than 60% of patients admitted to a hospital are treated in the OR.¹ Efficient use of OR capacity is pivotal since it is considered a high-cost environment but a limited hospital resource.² Because of the aging population and various developments in surgery, demands for OR facilities are likely to increase.² Moreover,

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because of shortages of qualified OR staff, optimal utilization of ORs is an ever-increasing challenge.¹

In ORs, however, inefficiencies can occur at several different moments during the day. They can occur before, during, between, and after cases.^{3,4} First-case tardiness (a “late start” of the first surgical case of the day) is a common source of frustration for patients, management, and the surgical team. Once a case is delayed, a typical “trickle down” effect causes the delay to increase as the day progresses, potentially affecting the rest of the scheduled patients.⁵ This might result in cases finishing late and over-utilization of OR time. Patient satisfaction may be reduced if cases are delayed beyond their scheduled start times, particularly if patients who had to fast are kept waiting for several hours. Cases scheduled later in the afternoon may even be cancelled as a result.⁶ This encouraged researchers to study factors that cause first-case tardiness.^{6–8} Although the majority of previous research focused on the origin of first-case tardiness, very few practical solutions to the problem have been studied.^{5,7,9}

In 2004, the OR departments of all 8 University Medical Centers (UMCs) in the Netherlands established a benchmarking collaboration, which has been active up to today. The objective of the collaboration is to improve OR performance by learning best practices from each other. Each UMC provides data on all surgical cases performed in their center to a central OR Benchmark database. Every 2 months multidisciplinary focus-group study meetings are organized to discuss the results of the data analysis and explore processes and practices “behind the data.” Through promoting dialogue between UMCs a learning environment is created. Furthermore, a national invitational conference is organized once per year to provide a broader learning and knowledge sharing platform. In comparison with the number of professionals attending the focus-group study meetings (approximately 25 to 30 professionals per meeting from all 8 UMCs), these annual conferences are visited by approximately 200 professionals.

The central OR Benchmark database – today containing more than one million records of surgical cases – is used to calculate key performance indicators of the utilization of OR capacity, eg raw utilization, turnover time, under- and over-utilized OR time, and first-case tardiness. These indicators are shared between UMCs, which enables the

identification of areas of improvement by comparing one’s own performance to that of other similar organizations.

This extensive database is also used for multicenter research on OR scheduling topics and OR efficiency. In this study, we aim to assess the effectiveness of interventions implemented to reduce first-case tardiness in a university hospital setting and to calculate the economic impact of first-case tardiness.

Methods

All 8 UMCs in the Netherlands provided data to the central OR Benchmark database on all surgical cases performed at those institutions. If an OR complex of a single UMC was divided into a main location and sub-locations such as a Cancer Center, Children’s Hospital, and Thorax Center, merely the main (largest) inpatient OR location was included. Longitudinal data collection within the OR benchmarking collaboration started in 2005 and is still performed today. An independent data management center administers the central OR Benchmark database. This center provides professional expertise to facilitate the collection and processing of data records. Subsequent to the collection procedure, this center performs reliability checks before data analysis. Data provided by the data management center were used to calculate key performance indicators of the utilization of OR capacity.

The performance of 1 OR day, which is generally equal to 8 hours of block time allocated to a specific surgical department, is commonly evaluated by the indicator “raw utilization.” The time when there is *no* patient present in the OR, the so-called “nonoperative time,” can be evaluated by 3 performance indicators: first-case tardiness, turnover time, and empty OR time at the end of the day, if cases finish earlier than scheduled. If cases run longer than the regularly scheduled hours of allocated block time, this is termed over-utilized time. All these performance indicators were calculated once per OR day (Fig. 1).

This study focused on first-case tardiness. Data analyzed in this research project were retrieved from the central OR Benchmark database from January 1, 2005 to December 31, 2011. All elective inpatient surgical cases were included. Day care surgery cases as well as nonelective (emergency)

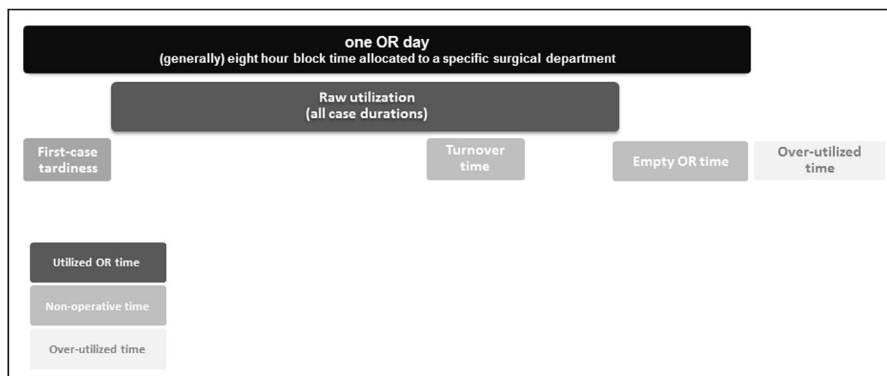


Figure 1 Indicators to measure the performance of 1 OR day.

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