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Successful strategies for the reduction of operating room turnover times in a tertiary care academic medical center

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ARTICLE INFO

Article history:

Received 3 October 2013

Received in revised form

1 November 2013

Accepted 11 November 2013

Available online 16 November 2013

Keywords:

Turnover time

OR efficiency

OR management

OR benchmarks

ABSTRACT

Background: Turnover time (TOT) is one of the classic measures of operating room (OR) efficiency. There have been numerous efforts to reduce TOTs, sometimes through the employment of a process improvement framework. However, most examples of process improvement in the TOT focus primarily on operational changes to workflows and statistical significance. These examples of process improvement do not detail the complex organizational challenges associated with implementing, expanding, and sustaining change.

Methods: TOT data for general and gastrointestinal surgery were collected retrospectively over a 26-mo period at a large multispecialty academic institution. We calculated mean and median TOTs. TOTs were excluded if the sequence of cases was changed or cases were canceled. Data were retrieved from the perioperative nursing data entry system.

Results: Using performance improvement strategies, we determined how various events and organizational factors created an environment that was receptive to change. This ultimately led to a sustained decrease in the OR TOT both in the general and gastrointestinal surgery ORs that were the focus of the study (44.8 min versus 48.6 min; $P < 0.0001$) and other subspecialties (49.3 min versus 53.0 min; $P < 0.0001$), demonstrating that the effect traveled outside the study area.

Conclusions: There are obstacles, such as organizational culture and institutional inertia, that OR leaders, managers, and change agents commonly face. Awareness of the numerous variables that may support or impede a particular change effort can inform effective change implementation strategies that are “organizationally compatible.”

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1. Introduction

Operating room (OR) efficiency continues to be a high priority for hospitals [1–4]. OR turnover time (TOT), the time from

“patient out of the OR” to “next patient into the OR,” is a common performance metric that is captured by hospitals [5]. Because it is easily measured and is subject to less patient-related variability than other OR processes, the TOT is also

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<http://dx.doi.org/10.1016/j.jss.2013.11.1081>

perceived to be a useful diagnostic measure of operational efficiency [6–8]. In 2007, when Brigham and Women's Hospital (BWH) first began routinely reporting TOT data on the hospital's Balanced Scorecard, the average TOT across 43 ORs—as measured by the time from patient out of the OR to next patient into the OR—was 54 min, significantly higher than national benchmarks [7,9]. Around the same time, clinical and administrative leadership assembled the Perioperative Governance Committee, a group of surgeons, anesthesiologist, nurses, and administrators who were charged with leading performance improvement initiatives to increase efficiency and predictability in the perioperative areas. TOTs quickly emerged as a leading candidate for improvement; the 54-min average was long seen as unacceptable to surgeons [10] and was significantly worse than times at other institutions. OR TOT is one of the classic measures of OR efficiency.

There are numerous publications and case studies describing efforts to reduce TOTs, sometimes through the employment of a process improvement framework, such as lean or six sigma [1,11]. However, most examples of process improvement in the TOT focus primarily on operational changes to workflows and statistical significance [3,7]. These examples of process improvement do not detail the complex organizational challenges associated with implementing, expanding, and sustaining change. Similarly, many publications do not mention the obstacles, such as organizational culture and institutional inertia, that OR leaders, managers, and change agents commonly face.

In the 5 y from the time when routine reporting of TOT data began, there have been three independent initiatives at BWH to reduce these times. Each initiative involved the same key components in planning:

- (1) Process mapping of turnover activities in a specific specialty.
- (2) Formulation of a revised process.
- (3) Piloting of the revised process by a single surgeon.
- (4) Development of informational materials.
- (5) Issue-selling to other surgeons in the specialty.
- (6) Implementation.

Two of these initiatives, one in 2009 and another in 2010, successfully accomplished steps 1–4; a third initiative, which began in November 2011, was the only one to successfully accomplish all steps and achieve sustained improvements in the target area after more than 12 mo. Here, we describe this particular experience and investigate why this effort succeeded where others failed.

2. Setting

Surgery at BWH—a large 793 bed academic medical center—is organized into 13 distinct surgical specialties, or services. The hospital performs on average 28,000–30,000 operations per year. These 13 specialties delineate how ORs are allocated to surgeons and how performance metrics are analyzed and reported. There are 43 ORs at BWH, all located on the first basement level (L1) of the hospital. These ORs are laid out in

such a way that there are several well-defined geographic boundaries that divide the OR into service-specific zones or pods (Fig. 1). The geographic layout of the ORs affects travel time and also the degree to which clinical and support staff—primarily nurses and OR assistants (ORAs)—“float” between different regions of the OR. For example, the orthopedic surgery ORs, 41–46, are isolated from the rest of the ORs so that staff working in this pod rarely work in other areas.

The target area for the successful November 2011 initiative was the general and gastrointestinal (GGI) pod, which encompasses ORs 18–28. This area was chosen because the surgeon leader for this initiative was a colorectal surgeon. However, there were additional characteristics that made this an attractive target site. The GGI pod is centrally located, near the combined preoperative holding area and post-anesthesia care unit, patient transport elevators, and main OR desk, which is responsible for coordinating patient flow for all 43 ORs. ORs 18–28 are also more likely to have out-of-service cases—non-GGI—performed in them, meaning that additional services may be exposed to new practices. Finally, because cases performed in ORs 18–28 tend to be shorter, these ORs will be turned over 2–4 times each day. As a result, a significant proportion of turnovers (30%–40%, about 400–500 per month) occurs in this pod.

The average TOT in the GGI pod was 48 min in October 2011 and 49 min in previous 12-mo period (October 2010–September 2011). The institutional (hospital-wide) target for the TOT was 45 min.

3. Methods

3.1. Data collection and analysis

Each OR is equipped with a networked computer terminal. Circulating nurses are responsible for logging distinct time points during the course of an operation, including the time points that are used to calculate the TOT—patient out of the OR and patient into the OR. TOTs were measured only when both the preceding and succeeding cases belonged to the same service. TOTs were excluded if the sequence of cases was changed from the initial plan or cases were canceled. Average TOTs are reported monthly for individual services and for the entire OR by an independent department in the hospital, the Center for Clinical Excellence. All data used in this study were subject to all standard exclusion criteria, as outlined previously, and a thorough quality assurance process is conducted by the Center for Clinical Excellence.

3.2. Process mapping

We mapped the activities of each member of the OR team during the TOT using previously constructed workflows and direct observation of turnovers in the GGI pod. There were four primary workflows, each representing a distinct discipline: (a) the surgical team, including the attending surgeon, fellows, and residents; (b) the anesthesia team, including attending anesthesiologists, fellows, and residents, and anesthesia technicians; (c) the nursing team, including the scrub technician and the circulating nurse; and (d) the ORAs,

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