Improving the Operating Room Turnover Process at Beth Israel Deaconess Medical Center

Abstract

The Department of Surgery at Beth Israel Deaconess Medical Center (BIDMC) in Boston, MA is experiencing prolonged turnover times between cases in the operating room (OR) suites. OR turnover time is defined as the time between one patient’s exit and the next scheduled patient’s entry to the same OR on the same day. Baseline data on performance measures for key steps within the turnover process was collected in vivo and from historical data in the Perioperative Information Management System (PIMS), including cleaning, set-up, instrumentation and supply acquisition, and pre-operative patient preparation. Analyses were performed using various statistical models, an ARENA simulation model, and time studies within the OR suite to predict the impacts of process modifications. Final recommendations include enhancements to existing staff communication systems, including attendant teaming and the integration of portable notification devices, in addition to the enforcement of a protocol requiring surgical instrumentation to be strung immediately following a case.
The Need for Project

Prolonged turnover times reduce workload capacity in the OR suites. The Department of Surgery at BIDMC in Boston, MA is experiencing prolonged turnover times between cases in OR suites. BIDMC reported a mean turnover time of 57 minutes with a significant number of turnover times exceeding the mean by more than 15 minutes. The mean turnover time is an important factor that affects the number of surgical cases seen during allotted OR hours. A shorter turnover time with lower variation will improve the overall efficiency of the OR suite.

The Design Project Objectives and Requirements

The objective is to provide recommendations to reduce process variations that result in prolonged turnover times.

Design Objectives

The objective is to identify improvements and provide recommendations to reduce process variations that result in prolonged turnover times. Prolonged turnover times can affect surgical cases by disrupting the schedules of doctors, nurses, and other support staff within the department, create conflicts when adding urgent cases, and increase overtime hours worked by staff. Factors such as procedure duration, quantities of add-on cases, and variation in staffing organization add to the complexity of the problem.

Design Requirements

The final design will not compromise patients’ safety, comfort, or quality of care.

Design Concepts Considered

Concepts considered included attendant teaming, stringing of instruments at the end of a case, and temporarily adding attendants during peak turnover periods. Design concepts considered were centered on three main components of the perioperative process. These include the ORs, the pre-operative patient holding area, and the Central Processing Department (CPD). The processes within each of these components were observed and design concepts were developed with the intent to reduce delays that result in instances of prolonged turnover times.

In the OR and patient holding area, communication breakdown was repeatedly cited as a common barrier to efficient work performance. The installment of improved overhead aural communication and notification boards indicating that a room is ready for turnover have been considered and proposed.

A design concept that involved attendant teaming was considered
as a potential solution for communication breakdowns between attendants. This concept entails teaming two or more attendants together for the duration of their shifts so that they have a partner to work with through similar tasks. This would have the greatest impact on attendant availability for tasks that specifically need more than one attendant, such as patient transport and OR cleaning.

A third design concept that spans both the ORs and CPD is a concept involving the stringing of surgical instruments at the end of a case. This is a process in which the surgical equipment is aligned on U-Shaped tools to allow for more efficient transport, cleaning, counting and assembly. Currently, stringing is done in CPD or not at all. The intent is to have this implemented in the OR by scrub nurses so that the decontamination and surgical kit assembly phases in CPD can be accomplished in less time.

**Recommended Design Concept**

Attendant teaming and improvements to existing communication systems will reduce the occurrences of prolonged turnover times.

The teaming of attendants throughout the OR suite is strongly recommended. From our simulation and pilot implementation, we determined teaming the attendants up will facilitate faster clean-ups and a better understanding of what has been and needs to be completed. The ARENA model was used as a basic guideline to determine if the changes proposed would be beneficial or if they would create longer queues.

In addition to the simulation, a precedence diagram was made to determine what was to be completed during a room turnover. This basic template served as the distinction between what needed to be done a specific point in time and what tasks could be done simultaneously. An integer value work distribution chart was to optimize the work of the attendants cleaning a room. These were developed for groups of two or three working at a time.

The major advantages of the recommended concepts are a reduction in room cleaning time with fewer communication breakdowns. Attendants are more likely to be readily available to transport a patient when called.
Financial Issues

Our project did not incur any direct costs, but the financial effects of our design to BIDMC were of major concern. Throughout the duration of our project, we did not incur any costs associated with research, analysis, or pilot implementation. We considered financial issues that could arise from the implementation of our recommendations and concluded that only one financial issue should be considered.

Additional attendant staffing in the ORs was considered, however it was determined that it was not the most economical solution to the problem. The contribution by the addition of attendants to a decrease in turnover time to would need to justify the additional cost for payroll.

Recommended Improvements

The major sources of inefficiency in the turnover process are communication breakdowns between staff members and the misuse of resources.

Within the theme of staff communication, a handheld solution is proposed. Small-scale development of an iPod application and system would incur minimal fiscal outlays while significantly improving attendant utilization. Additionally, continuation of the teaming studies that have been conducted can be utilized to improve attendant utilization.

Overall streamlining of the perioperative process can be achieved through enforcement of the pre-existing stringing protocol. As a result, surgical instrumentation decontamination and kit assembly will experience an increase in efficiency. The implementation of the recommended improvements will reduce turnover process time mean and variation.