

# Using lean methods to improve OR turnover times

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**T**he OR staff members at Parkridge Medical Center, part of the HCA Tri-Star Division, Chattanooga, Tenn, were experiencing difficulty meeting OR turnover goals. Extended turnovers increased patient and physician wait times and disrupted flow in the OR suite. The team averaged 20 minutes to complete room turnovers, and in some observed cases, they required 25 minutes. Absent personnel, missing supplies, delayed delivery of the patient to the OR, and undefined responsibilities were just a few of the factors affecting the team's turnover efficiency. Additionally, analysis of historical performance revealed a large degree of variation in room turnovers, indicating a lack of consistency within the process (Figure 1). The challenge for the OR staff was to reduce wait times by improving room turnovers while increasing process consistency to positively affect patient safety.

## THE LEAN HEALTH CARE APPROACH

Given the state of turnover time performance, the team at Parkridge Medical Center turned to lean health care methodologies for a solution.

*Lean Healthcare is a term that is permeating the consciousness of an industry that has for a long time struggled with skyrocketing costs, poor customer and employee satisfaction, complex and cumbersome [information technology] solutions, nursing shortages, physician frustration, and life and death problems caused by inadvertent errors and oversights.<sup>1</sup>*

Lean concepts, originally developed in the automotive industry, have since been deployed across multiple manufacturing and service industries to deliver high-

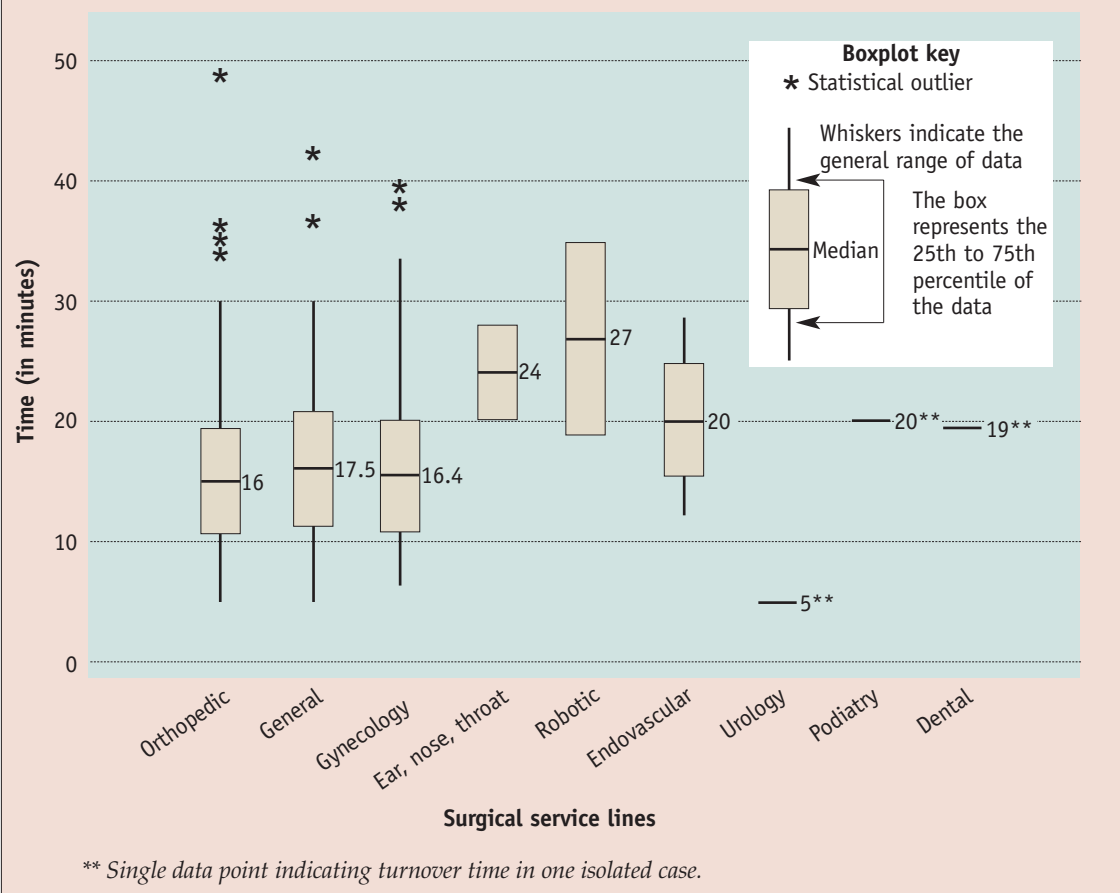
quality products and services while improving organizational performance and satisfying customers. Recently, some organizations have begun adapting these concepts for the health care industry.

The goal of lean health care is to approach processes with a keen eye for waste, as well as reducing wait times and unnecessary travel, while building quality, speed, and flexibility into the organization. Today, patients have more freedom to choose where they receive their medical services, so lean health care actually can be part of a growth strategy. By focusing on removing waste in daily activities, a facility increases the time staff members have to directly care for patients. Patient outcomes and the overall patient experience is enhanced, and this creates a growth opportunity for the health care organization.

Personnel from Parkridge Medical Center, with the assistance of an experienced lean health care facilitator, formed a Kaizen (ie, rapid improvement) team to focus on the turnover time issue. This team was composed of one RN, two radiology technologists, two scrub persons, and the director of surgical services. To improve room turnover performance, the team employed the lean tools of standard work and the assembly line concept of single minute exchange of dies (SMED), a concept in manufacturing wherein it takes 10 minutes or less to change over from producing one part to producing another part or product.<sup>2</sup> The SMED

*Lean health care is a strategy focused on removing inefficiencies and thereby allowing more time for patient care activities.*

**FIGURE 1**  
**Turnover Variation Analysis**



approach was developed in Japan and “has proven its effectiveness in many companies by reducing changeover times from hours to minutes.”<sup>3</sup> Perhaps the most heralded application of these concepts has been seen in the performance racing industry where SMED and standard work techniques have allowed pit crews to complete several minutes’ worth of work in a matter of seconds.<sup>4</sup> By orchestrating the activities of each crew member in detail, the teams are not only able to reduce the time it takes to “turn around” the race car, but they also maintain a safe and predictable outcome.

The same techniques are applicable in the OR where a defined set of tasks must be completed by the team in a safe and timely manner to minimize patient wait times and keep the OR on track. By applying these tools to OR turnover times, the Parkridge Medical Center team planned to reduce the amount of time that patients waited in the preoperative holding area as well as improve the safety of the overall turnover process for both patients and staff members.

**THE IMPROVEMENT PROCESS**

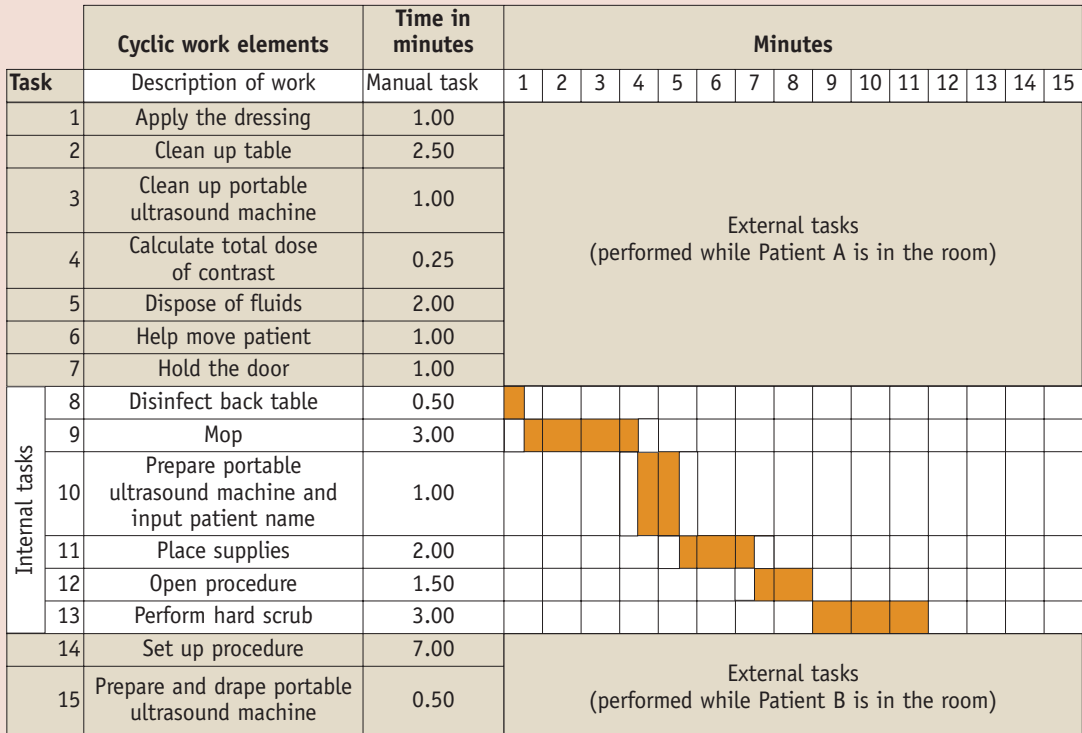
The endovascular suite was selected as a primary focus for turnover improve-

ment because quick turnovers could be advantageous to patients and physicians in a competitive local market. The existing team was experiencing average turnover times of 20 minutes, and the lack of a standardized process created a significant variation in performance.

The improvement process began with the Kaizen team identifying all tasks required to complete the room turnover by working through the duties of each staff member. The team then created standard work combination sheets which detailed the turnover tasks, the time required for the task, and whether the task was performed after the patient has

**FIGURE 2**  
**Standardized Turnover Chart**

**Area: Endovascular suite**  
**Role: Scrub person**



left the OR (ie, internal) or performed either before the patient leaves the room or after the next patient arrives (ie, external). An example of the tasks performed by the scrub person are detailed in Figure 2. Internal tasks were the primary focus for the team. As the process moves forward, more focus will need to be placed on gaining efficiencies in external tasks as well.

**PUTTING IT INTO PRACTICE**

With baseline standard worksheets completed, the team moved to a mocked-up OR to simulate actual OR conditions and to identify opportunities for eliminating inefficiencies. This technique was designed to allow team mem-

bers to experiment with different work combinations and roles without the pressure and stress that typically is present during an OR turnover. The team was able to simulate the turnover in real time and identify wasted motion, communication gaps, and opportunities to balance the workload. After each iteration, standard work combination sheets were revised based on the previous simulation and a new method was tested to identify further opportunities. An example of a change made during the exercise was altering the work sequence of the radiology technologist to include assisting the scrub person to prepare for the procedure, where this task

previously was the responsibility of the scrub person alone. As a result of these activities, the team redefined each person's responsibility for moving a patient to or from the OR more quickly while simultaneously increasing safety for the patient.

In addition, the team found that the tasks required to complete the turnover were not balanced among the team members. By balancing tasks, the team was able to significantly reduce the overall turnover time. The team also spent time deliberately determining the order of the tasks each individual should perform so that there was a better flow in the room during turnover.

**FIGURE 3**  
**Turnover Comparison**

**Pre-Kaizen OR turnover method**

Patient A		Turnover		Patient B	
Prep			Prep		
	Procedure	Turnover time			Procedure
Cycle time		Clean room, clean tools, obtain needed items, search for items, remove and replace equipment		Cycle time	

**Post-Kaizen OR turnover method**

Patient A		Turnover		Patient B	
Prep			Prep		
	Procedure	Turnover time			Procedure
Cycle time		Internal tasks		Cycle time	
	External Tasks	Clean room, prep room		External Tasks	

**THE OUTCOME**

As a result of this team’s recommendations and the balancing of the tasks,

- 7.5 minutes of internal work were moved to external and
  - five minutes of internal waste were removed.
- Additionally, there was
- a 45% reduction in turnover time,
  - reduced physician wait time for to-follow cases, and
  - reduced patient wait time in the preoperative holding area (Figure 3).

As with any new process, one of the primary challenges was sustaining the initial gains over the long term. The team at Parkridge Medical Center has experienced fluctuations in performance over time; however, an overall improvement has been sustained. Based on the results of their work with the endovascular suite team, Parkridge Medical Center is now apply-

ing the same principles across the remaining service lines.

The turnover time improvements made at Parkridge Medical Center can be realized at virtually any institution. The keys to improvement are developing a discerning eye for waste and a detailed understanding of how OR turnovers currently are executed. By empowering front-line staff members to examine the current turnover process, identifying and eliminating waste, and experimenting with improved turnover methods, other facilities may achieve similar gains.

Documentation of the new process and staff member education are just as important as the improvement process itself. Formal documentation using standard work combination sheets as well as effective and repeated communication of the improved procedure, will help to sustain initial gains. ❖

*Editor’s note: Publication of this article does not imply AORN endorsement of a specific training program.*

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## Defibrillator Malfunction Warnings May Be Inadequate

Approximately 20% of external defibrillators currently in use have the potential to malfunction, according to an Aug 8, 2006, article from HealthDay. Although the US Food and Drug Administration (FDA) posts advisories on the units that are prone to defects, these advisories often do not come to the attention of the appropriate people.

Defibrillator use may prevent sudden death from cardiac arrest, and the devices are becoming more common in public places as well as in private homes. The number of defibrillators issued each year has increased from 20,000 units in 1996 to 200,000 units in 2006. During the same

period, the FDA issued 52 advisories in the form of news releases from the FDA or the device manufacturer covering 385,922 defibrillators or related accessories. These news releases, however, may not be reaching the people who need to receive the information. In addition, although manufacturers ask individual buyers to return registration cards to help keep track of the devices, many consumers do not return the cards.

*E Edelson, "External defibrillator warnings not adequate," HealthDay (Aug 8, 2006) <http://www.healthday.com/view.cfm?id=534267> (accessed 9 Aug 2006).*

## Gene Interaction in Autism Discovered

The interaction of two malfunctioning genes may increase the risk of autism, according to a June 19, 2006, news release from Duke University Medical Center News, Durham, NC. Autism, characterized by repetitive behaviors and impaired social functioning and communication, is one of the fastest growing developmental disabilities and is seen in all ethnic groups. Identifying genes that correlate with increased risk for autism has been difficult because

- as many as 100 genes may be involved,
- each ethnic group possesses unique genes that can interact with those conferring risk, and
- multiple autism-associated genes must interact in an individual to result in autism.

Researchers analyzed the genes of 54 black

families and 557 white families with a history of autism. They looked for genes along chromosome 15 that regulate the neurotransmitter GABA, which inhibits nerve cells from firing after their message has been transmitted. When the GABA neurotransmitter system malfunctions, the brain can be flooded with sensory input that overwhelms its processing capabilities, leading to some of the behaviors seen in autism. The researchers found that in blacks and whites, the interaction of malfunctioning GABA receptor genes GABRB1 and BABRA4 may increase the risk of autism.

Gene Interaction Raises Autism Risk in Blacks and Whites (*news release, Durham, NC: Duke University Medical Center News, June 19, 2006*).