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Performance improvement

Using Lean strategies to improve operating room efficiency

Improvements in first case on-time starts and turnover time at Lancaster General Hospital in Lancaster, Pennsylvania, attest to the success of using Lean strategies. Within an 8-month period, first-case on-time starts (FCOTS) jumped from 35% to 72%, and the monthly average overall turnover time (TOT) for a 7-month period was reduced by several minutes.

Previous Lean assessments at Lancaster General, a 623-bed hospital with 20 ORs, had led to improvements in OR scheduling as well as the preanesthesia clinic and the preoperative unit. Because OR staff had ongoing difficulties in sustaining any improvements to FCOTS and TOT, it was decided to apply Lean strategies to these areas as well.

Lean is an integrated set of activities focused on minimizing waste and non-value-added activities, ie, things that take time and/or resources without direct benefit to the patient.

With the help of consultants, a multidisciplinary group of Lancaster staff participated in rapid improvement events (RIEs) to improve TOT and FCOTS within the main OR.

Metrics	Baseline	Current	Goal
Overall % FCOTS	39%	70%	80%
Neurology	30%	65%	80%
Otorhinolaryngology (ENT)	38%	100%	80%
General (bariatrics included) & vascular	44%	81%	80%
Plastics	47%	67%	80%
Dental	30%	67%	80%
Cardiovascular	41%	77%	80%
Podiatry	5%	100%	80%
Ophthalmology	33%	No Cases	80%
Gynecology	9%	No Cases	80%
Genitourinary	47%	100%	80%

Metrics	Baseline	Current	Goal
Overall room TOT	73 min	68 min	56 min
Teardown time (close to wheels out)	12 min	11 min	9 min
Wheels out to wheels in	29 min	27 min	20 min
Setup time (wheels in to incision)	32 min	30 min	23 min

Methods

An RIE is typically a 3-day event focused on documenting the current state of a process and then developing and implementing a future state by eliminating non-value-added activities.

First, historic data were analyzed to determine baseline figures and measures of performance for FCOTS and TOT. Thus, an internal benchmark was established as a point of comparison for future state data. Spaghetti diagrams, which provide visuals of the current state's flow, were used to document observations in the OR.

Consultants educated OR staff about the history of Lean and Lean concepts: 6S (Safety, Sort, Set, Shine, Standardize, and Sustain), 8 Wastes, closed-loop process improvement, value stream mapping, value-added vs non-value-added activities, and SMART (Specific, Measureable, Aggressive yet Achievable, Relevant, and Time Bound) goals.

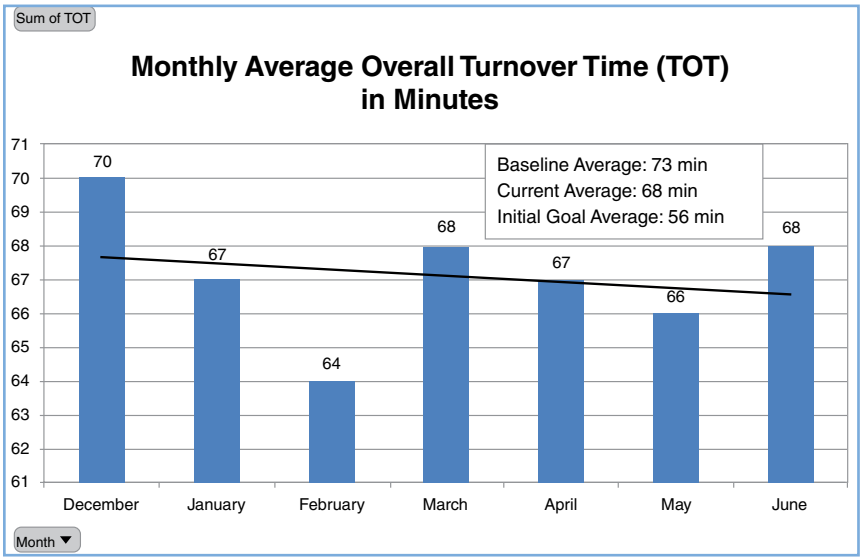
The team involved in process improvements, which consisted of OR nurses, preoperative RNs, surgical technologists (STs), anesthesia providers, postanesthesia

care unit (PACU) RNs, nurse managers, and physicians, was told to expect progress, not perfection. After the education session, the team documented the current state, and all activities within the process were marked as value-added or non-value-added.

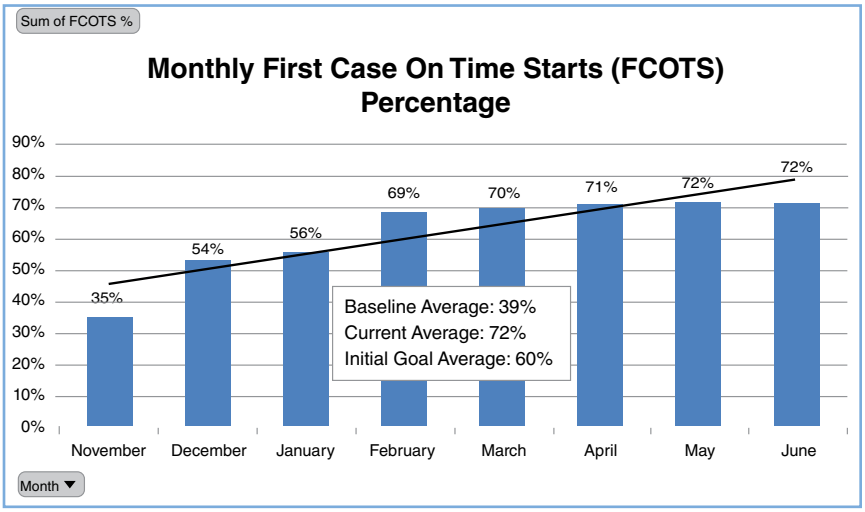
To establish the ideal future state, the team focused on removing waste and non-value-added activities and ensuring patient safety. The team was put into small groups to define processes and responsibilities pertaining to each role. Each individual action per role was documented on a sticky note so that steps could be rearranged, modified, or added according to what the group decided. Items needed to ensure successful implementation were added to either the "Just Do It" or the "Parking Lot" lists. "Just Do It" items could be accomplished immediately; "Parking Lot" items required acceptance and feedback from team members not present at the RIEs.

After agreeing upon and solidifying the definition of the future state, team members presented their work to the hospital's perioperative leadership team, which then provided feedback and expressed support for the RIE teams. Following the RIE, weekly meetings were scheduled with all team members to ensure timely completion of all "to do" items. Any roadblocks were presented to the leadership team via a 4Pane, which also displayed weekly data, accomplishments, and items to be accomplished in the near future.

The main components of the future state were as follows: defined standard policies and procedures; clarified roles and responsibilities; increased accountability, staff communication, and education with regard to process changes; data-driven decisions through performance measurement; and adjusting and sustaining as needed.



Monthly TOT values (in minutes) have decreased and continue to be monitored.



Monthly FCOTS percentages have steadily increased.

FCOTS

First case is defined as the first case scheduled in an OR before 9:30 am. On time is defined as wheels into the room before the scheduled start time; 1 minute after the start time is considered late.

In the prior fiscal year 2012, only 39% of OR cases had started on time. The initial goal set by the management team with approval from the physician-led governing board was 60%; however, after the 60% rate had been sustained for 12 weeks, the goal was increased to 80%.

During the RIE and for a few weeks afterward, numerous solutions were identified to improve FCOTS:

- A patient care completion matrix was developed prescribing exactly when critical patient care elements must be completed and by whom, with a deadline of no later than 15 minutes before scheduled surgery time.
- Colored flags were placed outside of all preoperative rooms to alert team members and providers where the patient was in the preparation process.
- It was decided to have the certified registered nurse anesthetist (CRNA) greet and interview the patient with the circulating RN in the preoperative unit. Additionally, the CRNA could premedicate the patient without a physician order if necessary.
- An SBAR (Situation Background Assessment Recommendation) tool was developed that combined both anesthesia and nursing requirements for a safe handoff throughout the perioperative experience.
- All ORs were damp-dusted and stocked, and computers were to be booted up by the night shift starting at 4:00 am.
- All OR staff were expected to begin opening packs and scrubbing 15 minutes before the scheduled case start.
- A daily after-action review huddle was set up to take place 15 minutes after cases start in the OR so that preoperative and OR leaders can discuss what went well or what did not go well and requires further action.
- A daily afternoon huddle was instituted to plan for the next day's cases. Leadership from the preoperative unit, OR, PACU, sterile processing department, and OR scheduling meet every afternoon to mitigate any issues.

TOT

Traditional TOT is defined as wheels out to wheels in of the next patient. However, the team decided to target TOT from the surgeon's perspective, which is close-to-incision. That time period was broken down into teardown time, wheels in to wheels out, and setup time, adding up to overall TOT.

The overall TOT from 11 months of baseline data was 73 minutes. The goal was to reduce that metric by 30%, or reduce down to 56 minutes.

The TOT event was held a month after the FCOTS event. The team also had to determine how the OR would function under a new surgical technologist (ST) staffing model. Historically, 2 scrub technicians had been assigned to each OR, but to increase efficiency, the future model had 1 ST assigned to each room and a second scrub technician or ST first assistant assigned for cases requiring additional support.

The following solutions for improving TOT were identified during the event:

- A new pod staffing model was devised in which 3 to 4 like specialty rooms comprise a pod with dedicated support staff assigned to each pod. Additional float staff are assigned to pods based on the surgical case type.
- A new surgical support aide (SSA) role was established with clearly defined and expanded responsibilities for before, during, and after surgical cases.
- Walkie talkies replaced overhead paging or passive phone communication, allowing immediate response.
- Job completion matrices were developed for basic and complex case turnovers. The matrix for each defines the expectations of who should be doing the work, when it should start, and when it should be accomplished.
- A 6S project was completed in the surgical equipment room.

Baseline, current (7/15/13 to 7/19/13), and goal values for each FCOTS and TOT metric being tracked are shown in the table.

Results

Adoption of Lean strategies has transformed the daily operations of the hospital's surgical units. The increased level of engagement among staff, administration, and physician partners has allowed for tremendous improvements in FCOTS and TOT. For accurate and timely data retrieval, a comprehensive database was built that included all the key time periods during a surgical encounter. Each perioperative leader was responsible for reviewing and reporting weekly variances from set goals as well as action plans associated with those variances.

The two graphs show monthly improvements in FCOTS from November 2012 through June 2013 and improvements in TOT from December 2012 through June 2013.

Based on the average number of OR minutes saved, the annual opportunity revenue for additional capacity for the 15 ORs is $2,338,245. Financial benefits have yet to be realized from this project; however, some high-performing surgical teams—namely bariatric—have been able to complete an increased number of cases within the normal block time. This is the first of many wins to come for Lancaster General Hospital. ❖

Trish L. Stoutzenberger, ST, CRCST, CHL (at right) is with Lancaster General Hospital. Colleagues involved in this project included Samantha A. Kitner, BSN, RN, and Brenda L. Ulrich, MSN, MHA, RN, CNOR, also with Lancaster General Hospital, as well as Ian D'Silva, MS, director of performance excellence, and Mitesh Shah, MBA, project manager, with Owens & Minor, a medical and surgical supply company headquartered in Richmond, Virginia.