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Maximizing efficiency on trauma surgeon rounds



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ABSTRACT

Background: Rounding by trauma surgeons is a complex multidisciplinary team-based process in the inpatient setting. Implementation of lean methodology aims to increase understanding of the value stream and eliminate nonvalue-added (NVA) components. We hypothesized that analysis of trauma rounds with education and intervention would improve surgeon efficacy.

Materials and methods: Level 1 trauma center with 4300 admissions per year. Average non-intensive care unit census was 55. Five full-time attending trauma surgeons were evaluated. Value-added (VA) and NVA components of rounding were identified. The components of each patient interaction during daily rounds were documented. Summary data were presented to the surgeons. An action plan of improvement was provided at group and individual interventions. Change plans were presented to the multidisciplinary team. Data were recollected 6 mo after intervention.

Results: The percent of interactions with NVA components decreased (16.0% to 10.7%, $P = 0.0001$). There was no change between the two periods in time of evaluation of individual patients (4.0 and 3.5 min, $P = 0.43$). Overall time to complete rounds did not change. There was a reduction in the number of interactions containing NVA components (odds ratio = 2.5).

Conclusions: The trauma surgeons were able to reduce the NVA components of rounds. We did not see a decrease in rounding time or individual patient time. This implies that surgeons were able to reinvest freed time into patient care, or that the NVA components were somehow not increasing process time. Direct intervention for isolated improvements can be effective in the rounding process, and efforts should be focused upon improving the value of time spent rather than reducing time invested.

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Introduction

The principles of Lean and Value Stream Management, which have been effectively used in the manufacturing industry for years, are beginning to be implemented into the field of healthcare to increase efficiency, minimize waste, and ultimately improve patient care.¹ Health care delivery requires

extraordinary complex organization, with thousands of interacting processes, not unlike the manufacturing industry.² The core idea of lean involves determining the value of any given process by distinguishing value added from nonvalue-added (NVA) processes, eliminating waste, and increasing efficiency, with the goal of every step in care adding value to the patient.³ Successful quality and efficiency

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improvement measures require implementation of small, incremental changes, continuous observation, measurement, intervention, and perpetual improvement.

To date, a number of medical systems have improved their processes through various lean techniques, yet there have been few published articles looking at improving rounding efficiency, especially in considering the complexities of multidisciplinary trauma rounds.⁴ A 2014 study from London assessed the variability of quality of surgical ward rounds and demonstrated poor-quality rounds placed patients at an up to 6-fold risk of developing preventable complications.⁵ Several projects of evidence-based lean improvements of rounding efficiency have proven successful. Akron Children's Hospital reduced NVA time per patient by 64%.³ Children's Healthcare of Atlanta looked at the impact of lean on rounding in pediatric intensive care unit, with a significant decrease in rounding time through a reduction in time spent on nonessential activities.⁶ These projects have shown that the rounding process is one that is amenable to lean type evaluation.

We hypothesized that via initiation of lean-based analytical, educational, and interventional activities, the trauma surgeons' efficacy and rounding speed would improve.

Materials and methods

Grant Medical Center is a level 1 trauma center admitting more than 4300 trauma patients per year. The average non-intensive care unit census during this study was 55 patients. Five full-time attending trauma surgeons were evaluated. For this study, we instituted an uncontrolled preintervention and postintervention cohort study using lean principles to assess and address areas of inefficiency in the surgeon rounding process. Collection of the data from this performance improvement project for use as a research study was approved by the OhioHealth Institutional Review Board that governs investigator initiated research at Grant Medical Center.

An initial session was held with key stakeholders in attendance. At this session were a trauma surgeon, a nurse practitioner, an inpatient floor nurse, and a nurse educator. The senior author functioned as moderator, chair, and record keeper. The senior author is the trauma medical director, and

as part of his master's in business administration received training in lean techniques, as well as having ongoing experience with efficiency interventions. Identified members of the rounding team were the attending surgeon, the nurse practitioners, a pharmacist, the bedside nurses, and the case managers. All components of the team to patient interaction were considered and were then defined to be value added or nonvalue added. All these components identified were included in the analysis. Value was defined from the perspective of what would be valuable to the patient during the actual rounding process. Value-added (VA) components included: patient report by the nurse practitioner, review of labs or radiology, bedside evaluation of the patient, the writing of notes in the patient electronic record, family-to-rounding team conversations, nursing conversations, consultation with therapists (speech, physical, or occupational therapy), consultation with case managers, or consultation with pharmacists. NVA components were identified as: conversation with consultant teams or physicians, answering pages or phone calls, teaching, nonpatient care conversations, travel between patient care units, delays in accessing information technology, breaks taken away from rounds, and physician-to-physician reports between two of the attending trauma surgeons (Table 1). Communication between attending surgeons and with consultant services was considered to be important, but the prerounding conference was determined to be the best forum for this interaction, for when it occurred during the bedside rounds this interaction was actually disruptive to rounds.

The primary identified "wastes" can be classified as "overprocessing" and "waiting." Waiting is defined by any idle time produced when two independent processes are not completely synchronized.⁷ Without complete synchronization and effective communication between members, extended rounds which include numerous NVA tasks kept the team members from accomplishing other duties relevant to patient care. Overprocessing waste results when unnecessary steps were taken to complete a task, reduces efficiency as the operators that are overprocessing could be performing other value adding tasks that would independently improve patient care.³ Consultant conversations and physician-to-physician sign out were considered so important that they were a part of a conference-style multidisciplinary morning report that occurred daily before physician rounds. Representatives of

Table 1 – Components of lean evaluation of trauma surgeon rounds.

Key stakeholders	Rounding team	Value added	Nonvalue added
Trauma surgeon	Attending surgeon	Patient report by NP	Conversation with consultant teams
Nurse practitioner	Nurse practitioners	Review of laboratories and radiology	Answering pages or phone calls
Inpatient floor nurse	Pharmacist	Bedside evaluation	Teaching
Nurse educator	Bedside nurses	Writing of notes	Non-patient-care conversations
	Case managers	Family conversations	Travel between units
		Nursing conversations	Delays in accessing IT
		Consultation of therapists	Breaks taken away from rounds
		Consultation with case managers	Physician-to-physician reports
		Consultation with pharmacists	

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