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A Mixed-Methods Research Framework for Healthcare Process Improvement[1]

Nathaniel D. Bastian ABD, MS, MEng[a,b,c,*], David Munoz PhD, MEng[a], Marta Ventura MS[a]

[a]*Center for Integrated Healthcare Delivery Systems, Department of Industrial & Manufacturing Engineering, The Pennsylvania State University, University Park, PA*
[b]*Center for Healthcare Innovation, Education and Research, Department of Health Organization Management, Texas Tech University, Lubbock, TX*
[c]*Center for Health and Humanitarian Systems, Stewart School of Industrial & Systems Engineering, Georgia Institute of Technology, Atlanta, GA*

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Purpose The healthcare system in the United States is spiraling out of control due to ever-increasing costs without significant improvements in quality, access to care, satisfaction, and efficiency. Efficient workflow is paramount to improving healthcare value while maintaining the utmost standards of patient care and provider satisfaction in high stress environments. This article provides healthcare managers and quality engineers with a practical healthcare process improvement framework to assess, measure and improve clinical workflow processes.
Design and Methods: The proposed mixed-methods research framework integrates qualitative and quantitative tools to foster the improvement of processes and workflow in a systematic way. The framework consists of three distinct phases: 1) stakeholder analysis, 2a) survey design, 2b) time-motion study, and 3) process improvement.
Results: The proposed framework is applied to the pediatric intensive care unit of the Penn State Hershey Children's Hospital. The implementation of this methodology led to identification and categorization of different workflow tasks and activities into both value-added and non-value added in an effort to provide more valuable and higher quality patient care.
Conclusions: Based upon the lessons learned from the case study, the three-phase methodology provides a better, broader, leaner, and holistic assessment of clinical workflow. The proposed framework can be implemented in various healthcare settings to support continuous improvement efforts in which complexity is a daily element that impacts workflow.
Practical Implications: We proffer a general methodology for process improvement in a healthcare setting, providing decision makers and stakeholders with a useful framework to help their organizations improve efficiency.
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THE HEALTHCARE SYSTEM in the United States is spiraling out of control due to ever-increasing costs without significant improvements in quality, access to care, satisfaction, and efficiency. In 2010, healthcare expenditures grew 3.9%, reaching $2.6 trillion (Martin et al., 2012). In order to transform the current healthcare system into one that is high quality,

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* Corresponding author: Nathaniel D. Bastian, ABD, MS, MEng.
E-mail address: ndbastian@psu.edu.

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patient-centered, and efficient, case studies can help drive process improvement efforts supported by evidence-based practices. The purpose of this article is to provide healthcare managers and quality engineers with a mixed-methods research framework for healthcare process improvement. Mixed-methods approaches use a systematic integration of qualitative and quantitative methods with the ultimate objective of developing a better and deeper understanding of a phenomenon (Chen, 2006; Creswell and Plano Clark, 2007). Thus, the use of both quantitative and qualitative tools becomes useful to foster the improvement of processes and workflow in a systematic way.

Among the various initiatives for reforming healthcare financing, value-based purchasing (VBP) is a strategy that is oftentimes used to measure, report, and reward excellence in healthcare delivery. VBP involves the actions of coalitions, employer purchasers, public sector purchasers, health plans, and individual consumers in making decisions that take into consideration access, price, quality, efficiency, and alignment of incentives. VBP promotes the quality and the value of healthcare services with a clear return for every dollar spent. It does so by eliminating healthcare errors, adopting evidence-based care standards and protocols, and re-engineering hospital operations and processes (Scanlon et al., 2002). An example of the way VBP seeks to reward hospitals for improving the quality of care is by distributing Medicare payments in a way so that the hospitals with higher performance in terms of quality receive a greater proportion of the payment than do the lower performing hospitals. To implement VBP or similar provider reimbursement mechanisms, there must be health system re-engineering that improves clinical processes and operations by increasing the value of healthcare delivered to patients. In an effort to help re-engineer a more valuable healthcare delivery system across the United States, healthcare managers and quality engineers can employ a mix of methods from industrial and systems engineering, management science, and information technology arenas to overcome the current barriers facing the successful implementation of process improvement in hospital settings.

Upon presentation of our mixed-methods framework for healthcare process improvement, we demonstrate its usefulness using a case study where we assess clinical workflow in the pediatric intensive care unit (PICU) at the Penn State Hershey Children's Hospital (PSHCH, 2014). Efficient workflow is paramount to improving value while maintaining the utmost standards of patient care and provider satisfaction in high stress environments, like the PICU. There are significant organizational factors within healthcare operations such as staffing, teamwork, patient volume, pressures of work, information technology, and structure that can impact patient outcomes and clinician satisfaction. Moreover, the dynamic environment of intensive care requires clinicians to change tasks many times when performing patient care activities. Hence, a key component of process improvement is better understanding of the various elements comprising workflow. Specifically, we must learn and incorporate the voice of the customer, uncover root causes to workflow inefficiencies, conduct task identification and categorization, and then assess and analyze the clinical workflow processes based on these tasks. These steps combined with quality improvement and data visualization tools can help to effectively drive process improvement efforts in a healthcare organization.

Healthcare managers and quality engineers, also referred as continuous performance improvement (CPI) consultants, are the main facilitators of process improvement in hospital settings (Weed, 2010). Understanding the interrelationships impacting and shaping system behavior can help drive process improvement efforts in healthcare operations. These efforts seek to understand systems, their sub-components, and their relationships to each other, while believing that the understanding of the interrelations and interactions among its elements deeply define the system and its behavior (Adam and de Savigny, 2012). With a better understanding of the system and its elements (i.e., clinicians, patients, processes, information, etc.), healthcare managers and quality engineers can more easily identify the leverage points leading to desired process improvement outcomes. The Lean Six Sigma methodology strives to eliminate waste of physical resources, time, effort, and talent, while assuring quality in production and processes. Therefore, the implementation of lean principles in a hospital setting can help maximize healthcare service value while minimizing waste. The identification and characterization of both value-added and non-value-added tasks helps to effectively assess workflow and focus healthcare process improvement efforts. Value-added tasks are those activities that transform material, information, or people into something that the customer cares about (e.g., diagnosis, treatment, care plan, etc.), while non-value-added tasks consume resources but do not add value (e.g., searching for supplies, staff waiting, re-work, redundant paperwork, etc.) to the process. There are numerous methods for process improvement using approaches such as value stream mapping, process flow mapping, system dynamics modeling, statistical process control, social network analysis, and simulation. Given the variety of existing qualitative and quantitative methods, the application of a mixed-methods approach proves useful to face the challenges for process and organizational improvement.

Literature Review

The application of process improvement and organizational change management methods in a hospital setting is not new, especially given the rapid growth of healthcare expenditures in the United States. With the onset of VBP financial incentive programs, which reimburse providers based on quality outcomes achieved rather than volume of health services delivered, health system re-design and re-engineering efforts have emerged to improve both value and quality of care as well as the efficiency of healthcare operations and processes. Methods that incorporate continuous improvement practices into organizational change can help guide and drive healthcare process improvement efforts.

For example, Jimmerson et al. (2005) used a lean thinking approach for re-designing work and processes within hospital operations to facilitate problem-solving activities.