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Surgical measurement framework: A new framework for quality care in surgical specialties

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ABSTRACT

There is little question that measuring and following surgical outcomes is necessary to guide improvement. However, measurement alone does not drive improvement and improvement efforts in surgical specialties are often hampered by the lack of a conceptual framework to translate outcomes into improvement. We propose a surgical measurement framework that provides a systematic, longitudinal approach for identifying key steps and processes in the management of surgical conditions. Application of this framework will facilitate standardization of processes of care as well as measures of care with the goal of achieving ideal outcomes for specific surgical conditions.

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1. Introduction

Over a century ago, renowned surgeon Ernest Codman¹ introduced the concept of the “end-result” and created a patient registry to monitor outcomes in his patients. Codman posited that the way to achieve improvement was to “admit and record the lack of perfection,” examine the causes of failure, address controllable factors and study the causes outside our control.² Albeit simple, he laid out the basic framework for surgical improvement. The field of adult cardiac surgery built on this work and established one of the largest clinical data registries to study and

improve outcomes; this serves as a basis for outcomes-focused research.³

Such collaborative efforts led to substantial improvements in patient care. However, this work was not broadly applied until the Institute of Medicine published *Crossing the Quality Chasm* in 2001 which advocated for the widespread application of quality improvement science in medicine.⁴ Since then, there has been a concerted focus on improving the quality of healthcare and our capability to monitor and improve patient outcomes. Much of this work has been based on the Donabedian framework of structure, process and outcome.⁵ Efforts to address outcomes in surgery prompted the development of the National Surgical Quality Improvement Program (NSQIP).⁶ NSQIP has subsequently expanded to both the private sector and pediatrics and is a mainstay for providing risk-adjusted outcomes, thus allowing for external benchmarking.^{7–9} Although NSQIP provides high quality data, it does not provide a conceptual framework to translate this data into a model

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that links important outcomes to the processes that improve them, and two recent studies demonstrated that measuring outcomes using NSQIP does not result in decreased complication rates or mortality.^{9–11} Donald Berwick¹² suggests that although monitoring outcomes is essential for improvement it alone is not sufficient to drive improvement. Improvement efforts in surgery also continue to be hampered not only by lack of standardized measurement, but by variability in care secondary to both patient and surgeon factors, poorly designed and executed studies and absence of a conceptual framework to guide improvement efforts.^{13–16} Clinicians may not know what constitutes “optimization” prior to surgical intervention or what care maintenance processes are necessary to achieve the best outcomes. The ability to look at measures longitudinally across the entire management period can assist in identification of areas where the processes fall short and also where the evidence fails to support these processes. Identification of gaps between knowledge and practice is necessary in order to address them.¹⁷ With these things in mind, we propose a surgical measurement framework that not only facilitates the identification of outcomes as well as key steps and processes in the management of surgical conditions but also provides a context that allows clinicians to translate these measures into clinical improvement.

2. Methods section

The development of this surgical measurement framework was carried out by a multidisciplinary group of physicians and improvement science experts at Cincinnati Children’s Hospital Medical Center. Panel members were selected based on their expertise in quality improvement/outcome measurement and their expertise in clinical management. The panel was charged with creating a framework that could be applied across surgical fields to guide improvement work for specific

surgical conditions. We reviewed current measures, improvement models and measurement frameworks as follows. First, a systematic literature search was performed using the following terms: quality improvement, outcomes, measures, surgical, measurement framework, measurement model, and conceptual model. Second, we searched websites of organizations involved specifically with quality and quality improvement using the same terms (Appendix A). All identified measurement frameworks and conceptual models were reviewed as abstracts and articles and were compiled into a summary document (Table 1). The strengths and limitations of existing models and frameworks were reviewed by the panel of experts and were used to develop the initial surgical measurement framework by complete consensus. The framework was further refined through an iterative peer-review process by specialists from multiple disciplines (otolaryngology, gynecologic surgery, plastic surgery, pulmonary medicine, emergency medicine and improvement science).

3. The general framework

The ultimate goal of this collaboration was to establish a measurement framework that could be applied to surgical conditions in order to improve interim and long term patient outcomes. This framework facilitates improvement by focusing on 3 primary areas¹: measurement of outcomes during each phase of care² identification of reliable processes of care³ mitigation of complications. These 3 areas were selected as the key aspects necessary to build a useful framework.

The management of most surgical conditions can be broken down into discrete phases of care (Fig. 1a), each of which has a different focus (e.g. identifying a surgical condition and optimizing a patient prior to surgery, the surgery itself, and both short- and long-term postoperative care). In each phase there are a set of variables and/or processes

Table 1
Existing frameworks and models for improvement.

Framework/model	Summary	Limitations
Donabedian framework	Describes relationship between structure, process and outcome.	Simplifies relationship between steps and does not easily incorporate patient/system factors.
Clinical value compass	Comprehensive model that incorporates all aspects of care process (e.g. functional, clinical, cost, satisfaction).	Does not separate out phases of care.
Measuring value in health care/ outcome measures hierarchy	Incorporates longitudinal outcomes.	Does not account for interim outcomes.
ICHOM model	Focuses on developing standard outcome measures.	Less focus on specific phases of care.
IOM model	Wide reaching focus on improving American health care delivery system. Provides overarching philosophy and domains to guide improvement.	Does not address phases of care.
Acute care model	Focuses on single episodes of acute care.	Not designed for application to longitudinal management.
Chronic care model	Focuses on longitudinal management of chronic medical conditions.	Designed for primary care.
CDC effectiveness of disease and injury prevention	Focuses on population level measures.	Difficult to apply at an individual patient level.
SEIPS model	Focuses on the entire work system.	Difficult to apply at an individual patient level.

Abbreviations: ICHOM, International Consortium of Health Outcomes Management; IOM, Institute of Medicine; CDC, Centers for Disease Control; SEIPS, Systems Engineering Initiative for Patient Safety.

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