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Moving the needle toward high-quality pediatric surgical care: How can we achieve this goal through prioritization, measurement and more effective collaboration? ☆



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ABSTRACT

Over the past decade, the American College of Surgeons Pediatric National Surgical Quality Improvement Program (NSQIP-Pediatric) has greatly improved upon our ability to measure, benchmark and compare outcomes as they relate to pediatric surgical care. Several factors have served to mold the program's evolution and data collection paradigm over time. These have included a broader understanding of what quality measures should be captured and compared from the perspectives of different stakeholders, identification of conditions where quality and process improvement efforts may have the greatest relative impact from a public health perspective, and increasing evidence in support of collaborative networks to accelerate quality improvement through the dissemination of best practices. The purpose of today's lecture is to review these factors in the context of a comprehensive road map for optimizing the quality of pediatric surgical care, and the role that NSQIP-Pediatric has and will continue to play as the foundation supporting this road map.

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Good morning, members and guests. First of all, I would like to thank Dr. Fitzgerald and the Board of Governors for the wonderful opportunity to visit Vancouver as this year's MacLeod lecturer. I have to admit that when Dr. Fitzgerald contacted me about the opportunity I was certain that he had the wrong person. A quick review of the previous MacLeod lecturers left me a bit weak in the knees; many would be considered "giants" in our field and have left an indelible mark in the context of their mentorship, teaching, and scientific achievements. This forms the evidence-based premise for my first disclaimer, and that is that I simply do not deserve to be on this list - and I sincerely mean that. That being said, it is truly an honor to address this crowd today on the topic of quality and safety, a topic that I am particularly passionate about.

It is also a very special honor in that Drs. Erik Skarsgard and Baird Mallory are both in attendance today, two individuals who had a profound influence on me nearly 17 years ago as an impressionable young intern at Stanford Medical Center. I began my rotation on the pediatric surgical service not having a clue what I was going to do when I "grew up", and left knowing I could be nothing other than a pediatric surgeon. I attribute this to the extraordinary mentorship (and subsequent friendship) of both Erik and Baird, along with Larry

Moss who unfortunately is not in attendance today. The fact that Dr. Skarsgard is your incoming CAPS president makes this a particularly special experience, if not even a bit surreal.

In giving a lecture on the topic of quality and safety in pediatric surgery, I would be remiss not to delve deeply into the history, evolution, and future state of the American College of Surgeons (ACS) Pediatric National Surgical Quality Improvement Project (NSQIP-Pediatric). The program remains the only risk-adjusted, multi-center benchmarked comparative performance platform for pediatric surgical care. I am pleased to report that there are now four Canadian hospitals participating in the program, and we hope to see participation grow even further with expansion of the ACS Children's Surgery Verification Program, a topic presented in this same forum just a few years ago by Dr. Keith Oldham [1]. However, a broader goal of my lecture today is to describe a comprehensive roadmap toward high-quality pediatric surgical care of which NSQIP-Pediatric is just one (albeit fundamental) component. This roadmap is composed of four closely related elements, which include: 1) development of a common framework for defining and categorizing quality as it pertains to pediatric surgical care, 2) identification of conditions within pediatric surgery where quality and process improvement efforts may have the greatest impact from a public health perspective, 3) development of a benchmarking platform for the measurement and comparison of pediatric surgical quality across hospitals (i.e. NSQIP-Pediatric), and 4) development of the necessary infrastructure to support collaborative knowledge-sharing among hospitals. Each one of these components could justify its own one hour lecture, if not more, but my

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goal today is to provide you with a 30,000 ft view of how this roadmap is coming together within the context of recent efforts and available data, and the role that Pediatric NSQIP has and will continue to play as the foundation to support these efforts.

Before we begin, I do have two additional disclaimers. The first is that much of the work I will be covering today reflects an enormous amount of time, effort, and dedication from many individuals that have participated in the growth of NSQIP over the past decade, especially Drs. Douglas Barnhart and Jackie Saito. It is a tremendous honor to share with you some of the accomplishments of the program on their behalf. My final disclaimer is that much of what I will be covering today may come across as somewhat “Americo-centric”, as I will largely touch on efforts, programs, and data that have originated south of the Canadian border. It is likely that many parallel and complimentary efforts have been or are currently underway in Canada (supported by the CAPS organization and otherwise) that may dovetail well into this roadmap. Over the course of today’s lecture, please keep this in mind and think about opportunities for collaboration between our organizations that should be explored. In this regard, I hope to set the stage for some vigorous and productive discussion following the lecture in not only how we can increase Canadian participation in NSQIP, but how we may work together across borders to further refine this roadmap for the collective benefit of our patients.

1. Roadmap component #1: creation of a framework for defining and categorizing quality in pediatric surgical care

So where should the roadmap begin? Development and successful negotiation of a roadmap for high-quality surgical care should first begin with the development of a common understanding and framework for defining quality. This can be challenging because of the subjectivity of what constitutes “high-quality” care, as well as differences in the perspectives of different stakeholders on this matter which include surgeons, patients (and their caregivers), hospitals and payers. It is a bit like politics and religion, where many of us may have firmly held beliefs and internal prioritization schemas regarding what is important, albeit with very little objective data to back them up.

To illustrate this further, consider a child presenting with suspected appendicitis, a relatively “straightforward” condition that we all manage on a regular basis. In the context of diagnostic “quality”, is it better for a hospital to have a 2% rate of computed tomography (CT) utilization or a 2% negative appendectomy rate? What is the ideal balance between a hospital’s negative appendectomy and CT utilization rates, and how many CTs are worth the prevention of one negative appendectomy? How do we balance the potential harm of a CT scan against the increased cost and patient anxiety that may be associated with an overnight hospital admission for serial abdominal exams? How do we weigh and incorporate patient preferences into the mix, which may or may not be aligned with the agendas of the surgeon, hospital, and payor? These are all challenging questions with no simple or evidence-based answers. Even within this room of very educated and dedicated surgeons, there is likely to be a broad range of opinions around these issues. And remember, we are just talking about appendicitis here; perspectives surrounding what constitutes “high-quality” care (and how different aspects of care should be prioritized) are likely to be even more complex when considering conditions such as gastroschisis and congenital diaphragmatic hernia.

Although it may be a futile exercise for us to arrive at a consensus surrounding the relative importance of different aspects of quality for different conditions, we can and should strive to establish a consensus surrounding what should be measured from the perspectives of all relevant stakeholders. In this regard, I would like to introduce the concepts of quality assessment as proposed by the Institute of Medicine (IOM) and Donabedian model. The one thing I did not want to do today is bore you with a labored and dry discussion around the principles and practice of quality and process improvement. I hope that will still be the case, however, a brief review of these concepts

will be important to establish a context for the rest of the lecture, particularly when we review the expansion of quality measures captured by NSQIP-Pediatric. Furthermore, it is more than likely that you will increasingly hear (and read) about healthcare quality and measurement in the context of these two classification schemes.

The Institute of Medicine (IOM) initially described their six dimensions of health care quality in their landmark publication, *Crossing the quality chasm: A new health system for the 21st century*, published nearly 16 year ago [2]. These six dimensions pertain to care that is deemed safe, effective, patient centered, timely, efficient and equitable. The dimensions were developed to capture the perspective of all stakeholders in the context of what could be considered “high-quality” care, and were designed to be generalizable across a broad range of medical and surgical conditions. An example of how the IOM approach could be used to categorize and assess quality associated with the diagnosis and management of appendicitis is shown in Table 1. The advantage of the IOM classification is that it is fairly straightforward and intuitive, but critics point out that the approach does not provide information surrounding a hospital’s infrastructure (or how that infrastructure is used) to achieve outcomes representative of “high-quality” care.

The Donabedian model approaches the measurement of health care quality a bit differently. According to the Donabedian approach, information about the quality of care for any condition can be drawn from three inter-related categories, which include structure, process, and outcome measures [3]. The structural component describes the context in which care is delivered through hospital resources, including physicians, ancillary staff, equipment and other resources, while process refers to the interaction between patients and the hospital environment during the episode of care. Outcomes refer to the ultimate effects of both the structural and process elements on the health status of a patient. The Donabedian approach is designed to assess the quality of care not only in the context of whether the desired outcome was observed, but also whether the necessary components to achieve this outcome were available and used effectively. An example of how the Donabedian

Table 1

The six dimensions of health care quality as defined by the Institute of Medicine (IOM) [2].

IOM Quality Dimension	Definition & examples of relevant practices & measures for
Effective	Providing care that is evidence-based <ul style="list-style-type: none"> • Use of narrow-spectrum antibiotic prophylaxis rather than extended-spectrum agents (e.g. Piperacillin/tazobactam) in patients with uncomplicated appendicitis [24]. • Use of oral antibiotics rather than peripherally-inserted central catheters for post-discharge antibiotic therapy in complicated appendicitis [25].
Safe	Avoiding harm to patients from the care that is intended to help them <ul style="list-style-type: none"> • Rates of missed appendicitis and negative appendectomy • Rates of surgical site and deep organ space infections
Timely	Avoiding potentially harmful delays in the delivery of care <ul style="list-style-type: none"> • Median time to appendectomy following presentation
Patient-centered	Providing care that is responsive to patient preferences and values <ul style="list-style-type: none"> • Shared-decision making available surrounding the diagnostic process (e.g. use of extended observation periods versus computed tomography for equivocal cases) and in the management of complicated disease (operative versus non-operative management during the initial encounter; interval appendectomy versus observation following discharge)?
Efficient	Providing care that minimizes waste <ul style="list-style-type: none"> • Median operative case duration for a patient with uncomplicated appendicitis • Rates of return visits to the emergency department and inpatient setting
Equitable	Providing care that does not vary in quality because of gender, ethnicity, geographic location, or socio-economic status. <ul style="list-style-type: none"> • Do hospital-level differences exist in any of the IOM quality dimensions when stratified by these patient characteristics?

Examples are provided to illustrate how this framework can be applied to the assessment of quality for the diagnosis and management of pediatric appendicitis.

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