

Anesthesia Quality and Safety

Advancing on a Legacy of Leadership

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Editor's Note: Patient morbidity and mortality directly associated with intraoperative anesthesia have been dramatically reduced in the past 50 yr, and the specialty is held as an example of progress in patient safety. Over the next 3 months, we present six editorials on the changing definitions of safety across the perioperative period and how anesthesiologists can participate in and lead the transformation of health care with focus on patient value. There were to be seven editorials, but Elizabeth A. Martinez, M.D., M.Sc., died before she could complete her editorial. We dedicate this series to her memory.

IN 1978, ANESTHESIOLOGY published a landmark article by Cooper *et al.*,¹ “Preventable Anesthesia Mishaps: A Study of Human Factors.” Anesthesia providers were interviewed about critical incidents with the aim of finding patterns for “prospective investigation.” For the time, this was a departure from the traditional basic science reports typically presented in the anesthesia literature. In airing what was generally kept as private information about a hospital’s near misses, the authors started an international conversation about human factors and error in anesthesia. Some believe that this article also sparked the patient safety movement in anesthesia and, in turn, in all of medicine.

Jeffrey B. Cooper, Ph.D. (Professor, Department of Anesthesia, Harvard Medical School, Boston, Massachusetts) has been recognized for his meritorious service to the field of anesthesiology and his influential achievements as the 2012 recipient of the American Society of Anesthesiologists Distinguished Service Award. This event inspired reflection of our specialty’s achievements in quality and safety, as well as a discussion of ongoing challenges in each of these fields. This editorial will be the first of a six-part series in ANESTHESIOLOGY that addresses some of the most vital issues in today’s quality and safety landscape: (1) external pressures of health reform,



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(2) integrated technology, (3) data analysis and reporting, (4) human factors, and (5) process improvement. In addition, all six editorials carry the common themes of leadership, teamwork, culture, and learning from our errors. Secondary goals of this opening editorial are to touch on the expanded scope of quality and safety of today’s practice, discuss why we should continue our leadership role in this critically important aspect of health care, and present a framework for integration of quality and safety activities to help achieve our desired outcome of *no more failures*.

In their editorial, also published in this month’s issue, Glance and Fleisher² review how the healthcare environment is changing in response to cost pressures and implore our specialty to have a voice in healthcare reform by taking responsibility for a broader array of outcomes. We must increase the value we deliver to patients by delivering a consistently high quality of care and improving on meaningful perioperative outcomes, while at the same time reducing costs with improved efficiency and reduced waste.³ We also need to recognize that quality and cost are linked and that the best way to reduce costs may be to focus on quality first, a concept introduced by Deming⁴ in the 1950s when he transformed service delivery and product design in manufacturing.

Image: J. P. Rathmell.

Accepted for publication November 12, 2013. From the Department of Anesthesia, Critical Care, and Pain Medicine, Massachusetts General Hospital, Boston, Massachusetts (A.V.A., L.K.M., and M.C.M.P.-S.).

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Since the publication of the article by Cooper *et al.*¹ in 1978, there have been tremendous advances in monitoring, anesthesia delivery systems, ventilators, drug pumps, and airway management technology. However, as Pronovost *et al.*⁵ will discuss in their editorial, advances in technology have not always resulted in superior quality or decreased cost. The goals of improved quality and safety will likely only be achieved *via* better integration of technology, with thoughtful transdisciplinary coordination of clinicians, social scientists, engineers, and regulators.

With advances in computing and information technology, we now live in a world inundated with data. Large national registries and databases, including the American College of Surgeons National Surgical Quality Improvement Project, the Anesthesia Quality Institute's National Anesthesia Clinical Outcomes Registry, and the Multicenter Perioperative Outcomes Group, allow for new opportunities and create new challenges of translating data into useful, relevant, and actionable information. In his editorial, Kheterpal⁶ will address the important considerations that will affect our success in this new world of "big data analytics."

The last 3 decades have also witnessed significant advances in our appreciation of how human factors can help or hurt

quality and safety. In their editorial, Weinger and Gaba⁷ will specifically define how quality and safety are related but separate entities and then review approaches to improvements that involve harnessing the expertise of "front-line" clinicians and supporting their needs. Successful implementation of reform requires a brand of leadership that backs establishment of infrastructure, systemic supports, and a culture of interdisciplinary "learning and improvement." In their editorial, Simon and Muret-Wagstaff⁸ will describe a program to foster such organizational learning *via* commitment from leadership to support interdisciplinary teamwork projects, engagement of front-line staff, and care-unit-based quality initiatives. In this model, continued growth and improvements are sustained through mechanisms to rapidly test changes and adapt to changing conditions.

An important success factor for a quality and safety program is having a framework and structure to support it (fig. 1). In their 1978 article, Cooper *et al.*¹ noted that the "quality of the data could be improved by employing a prompt reporting method." This led to the advent and evolution of mandated, peer protected Quality Assurance committees nationally to enable timely reporting and review of



Fig. 1. Through the process of investigating critical events, reviewers generate ideas about potential interventions to avoid similar events from happening in the future. These ideas, or recommendations, are then passed to the improvement and innovation arm which tests the ideas and implements solutions to reduce the risk of future events. Interventions that are shown to be effective may be adopted by policymakers who are also responding to critical events and seek to make changes that will protect all patients regionally or nationally. Often, hospitals are required to measure and report on their compliance with policies (*e.g.*, administering prophylactic antibiotics) or outcomes (*e.g.*, surgical site infection) which may drive a local need to adopt improvement efforts to meet requirements and metric targets. Identified critical success factors for effectively and efficiently managing quality and safety are leadership, technology, performance measurement, teamwork, and culture. QI = quality improvement.

critical incidents.⁹ The primary objective of these activities was to review adverse events and near misses to determine what happened and why.

Frequently, Quality Assurance committees would identify interventions that could potentially mitigate the risks of adverse events for future patients. Despite noble intentions however, strong organizational, political, and cultural barriers can make change difficult and time-intensive, and can prevent even the best recommendations from being carried through to a level of sustainable implementation. After many years of experience, most anesthesia departments are well versed in the process of event investigation and review. By contrast, the discipline of process improvement is a relatively new addition to the quality and safety landscape and, while implicitly linked to investigation and review, it requires dedicated resources and nonclinical methodologies. Without an independent effort dedicated to improvement, as new critical events inevitably arise, attention and resources are pulled back into the required investigation and review process, leaving improvement efforts unfinished and barriers to change intact.

Boudreaux and Vetter¹⁰ have recently described their institutional experience implementing a structured quality improvement program. It has also been our own experience that this provides an important and previously missing link in the quality and safety agenda. Dedicating resources to building out a program that focuses on defining problems, mapping optimal future states, identifying metrics for success, and brainstorming and refining potential solutions is key. Transfer of recommendations from the investigation and review to the innovation and improvement arms of a program increases the feasibility and reliability of rapid response and iterative improvement after events. Another important result of dedicated improvement efforts is more natural fulfillment of regulatory requirements. Regulators are more frequently asking for data on performance and outcome measures, a natural component of process improvement. It is also necessary to dedicate resources to ensure maintenance of regulatory compliance. By satisfying regulatory requirements indirectly through investigation and improvement activities that are often focused on high priority local needs, quality and safety programs are able to more efficiently and effectively deploy limited resources.

Finally, a recurring theme for advancing quality and safety is having a culture that supports it at every stage of the process. Martinez *et al.*^{11,12} have described how improving safety culture and communication can affect the occurrence of adverse events, as well as our resilience and our recovery from them. Similarly, an authentic safety culture supports effectiveness of event investigation and subsequent innovation and improvement processes. This includes clear support and commitment of improvement efforts from senior leadership, and a shared sense of responsibility and accountability for resolving issues. Thus, all role groups and clinical divisions must be

represented in the improvement planning process and in the implementation of practice changes. The desired result is a safe environment that allows teams to be openly communicative, highly collaborative, and optimally productive.

Anesthesiology has a long history of leadership in quality and safety and was the first specialty to adopt a national standard for safety improvements. In 1986, anesthesiologists and other stakeholders from across the nation came together to form the Anesthesia Patient Safety Foundation—the first-ever foundation dedicated to patient safety and the example that the National Patient Safety Foundation chose to emulate. Safety efforts were further advanced by innovators including David Gaba, M.D. (Professor, Department of Anesthesia, Stanford University School of Medicine, Palo Alto, California), and J.S. Gravenstein, M.D. (1925–2009, Professor, Department of Anesthesiology, University of Florida, Gainesville, Florida), who were pioneers in the use of medical simulation. With advances in information technology, the development of national databases with large volumes of high-quality clinical data, and external pressure to deliver better care at a lower cost, we again have the opportunity to lead in advancing quality and safety.

As we continue to focus attention on the human factors that lead to error or adverse events, we will need to be thoughtful and courageous about how this understanding can inform effective interventions. We need to foster safety climates that will make positive changes authentic and sustained. We need leaders that care about these issues and are willing to stand firm in the face of increasing financial pressures. When quality and safety are our top priority, unnecessary waste will be reduced, productivity and efficiency will be improved, and our patients will benefit most.

Competing Interests

The authors are not supported by, nor maintain any financial interest in, any commercial activity that may be associated with the topic of this article.

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ANESTHESIOLOGY REFLECTIONS FROM THE WOOD LIBRARY-MUSEUM

Unbalanced Anesthesia? “Cleveland’s Ether” and “Political Oxygen”



“Can Dr. Lorenz Cleveland straighten out the old Democratic mule?” So asked *Judge*, a Republican-supported weekly magazine, which featured a cover pictorial (left), on its January 17, 1903, issue, of a weakened Democratic donkey wobbling on perhaps one straight leg and three crooked ones. Political cartoonist Grant Hamilton has labeled the weakened legs as the “Expansion Leg,” the “Financial Leg,” and the “Tariff Leg.” The former U.S. President and beleaguered Democrat, Grover Cleveland, apparently will need to administer “Cleveland’s Ether” along with “Political Oxygen” (close-up, right) to tackle what cartoonist Hamilton has titled “A Tough Job.” (Copyright © the American Society of Anesthesiologists, Inc.)

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