Disruptive Education

Training the Future Generation of Perioperative Physicians

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THIS issue of ANESTHESIOLOGY contains a collection of articles describing "care redesign" in health care. This term encompasses many interpretations of the goals and objectives for redesigning the perioperative or periprocedural health care. An example of a circumscribed care redesign initiative was the operating room (OR) of the Future Project from the last decade. The goal of the OR of the Future Project was to examine the operating room systems to make them more efficient and improve utilization. The project was notable because it analyzed, among other things, the impact on its stakeholders, including participants.[1–5] Healthcare organizations continue actively seeking solutions, such as the OR of the future, to improve the operational performance under the pressure of declining reimbursements.

"Training the next generation of anesthesiologists to participate in the planning and leadership of new innovations in a value-driven care must become an important element of our training programs."

A prominent current care redesign initiative is the Perioperative Surgical Home (PSH). The PSH aims to transition focus from the intraoperative period to the entire perioperative period, expanding the role of the consultant anesthesiologist in assisting our surgical colleagues to provide higher-quality and more cost-effective care. The OR of the future, the PSH, and the projects described in this issue represent the substantial efforts to redesign how we provide care. These projects all represent significant departures from previous thought, and they provoke us to reflect whether the current content and structure of anesthesiology education is suited to facilitate such innovation.

The implicit expectation is that care redesign will improve the value for patients by improving quality and/or reducing cost, but many questions are unanswered even as healthcare organizations scramble to adapt to face new pressures. For example, how and why do care redesign initiatives arise in healthcare organizations? How are they managed, evaluated, and concluded? How do clinicians learn to participate in and lead such projects? Change in a technological environment involves altering the way people, processes, and technology work together. Does our current system of education in anesthesiology prepare clinicians to be the agents (and subjects) of change in the complex healthcare environment as we focus on improving value? Are residency training programs responding to this paradigm shift by changing curricula? Are we training residents to actively embrace and manage change, and importantly, to evaluate the outcomes? We would assert, based on the experiences like the OR of the future, that until now there has been little formal medical education on the topics of initiating, leading, and assessing the outcomes of care redesign in medicine.

Training the next generation of anesthesiologists to participate in the planning and leadership of new innovations in a value-driven care must become an important element of our training programs. If the PSH is in fact the future of our specialty, how should anesthesiology residency programs teach concepts to move the specialty from current state to the PSH? Currently, anesthesiology training is largely conducted in silos; residents receive training in intensive care units, pain management clinics, and in the operating room, without a unifying experience to tie the arc of periprocedural patient care together. Furthermore, the skills needed

Image: J. P. Rathmell.

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to create, lead, and improve a PSH or perioperative consultation service are not well represented in current training models.[6] One might assert that perioperative medicine has always been the province of anesthesiologists. If so, the currently siloed structure of anesthesiology education needs a unifying and expanded experience to educate trainees for this new role.

A Perioperative Medicine Training Model

In 2014, the authors partnered with surgical colleagues at the Vanderbilt University Medical Center to create an Anesthesia Perioperative Consult Service (APCS). The APCS coordinates perioperative care alongside the surgical team for patients undergoing surgical procedures, creating a surgical home for these patients from preoperative evaluation through postdischarge care. The APCS is staffed by anesthesiologists and anesthesiology residents. Residents are at the heart of the APCS. They provide important staffing, practice the art of close consultation with their surgeon counterparts, manage the daily work of the service, and lead the creation of new protocols and service lines for what has become a popular and rapidly expanding service.

The APCS collaborates with surgeons from a growing number of procedural lines to apply evidenced-based surgical and anesthetic care to these surgical populations. Surgeons, anesthesiologists, and anesthesia residents develop procedure-specific guidelines to provide evidence-based preoperative evaluation, optimization, and management, perioperative goal-directed fluid therapy, multimodal opioid-sparing pain management, nausea prevention and control, standardized anesthesia and surgical techniques, early refeeding, early ambulation, transitions in care, and postdischarge follow-up. In other words, these are enhanced recovery after surgery pathways for multiple patient populations. Daily rounding by the APCS and close communication with the surgical teams are critical to the success of these efforts. In addition to changing patient care, the APCS provides a 4-yr, longitudinal training curriculum with the didactic and clinical education experiences necessary for the anesthesiology residents to learn concepts that prepare them to lead care redesign throughout their careers.

Residents receive professional development lectures that include training in quality improvement, LEAN Six-Sigma methodologies, patient safety, healthcare policy, healthcare finance, patient-centered outcomes research, clinical informatics, medical humanities, and an introduction to the concept of disruptive innovation. Trainees then exercise these skills by collaborating with surgeons and anesthesiologists to develop longitudinal quality improvement projects during the course of their residency. These projects can be an enhanced recovery after surgery pathway for one patient population (*e.g.*, colorectal surgery), which we have dubbed a "vertical pathway," or a clinical guideline that covers one specific health topic relevant for many patient populations (*e.g.*,

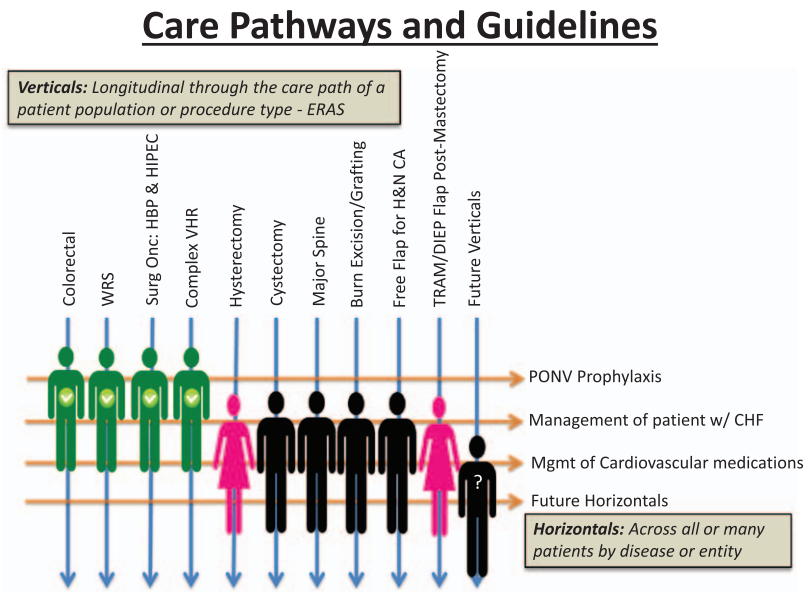

Fig. 1. Vertical and horizontal pathways in development as of August 2015. Vertical pathways describe care provided through an entire care path of a specific patient population or procedure type. Horizontal pathways describe care across all or many patients by disease or entity. *Green verticals* are developed and implemented. The postoperative nausea and vomiting (PONV) horizontal is developed and implemented; creation of electronically mediated PONV decision support is under way. CHF = congestive heart failure; DIEP = deep inferior epigastric flap; ERAS = enhanced recovery after surgery; HBP = hepatobiliary and pancreatic; HIPEC = hyperthermic intraperitoneal chemotherapy; H&N CA = head and neck cancer; Mgmt = management; TRAM = transverse rectus abdominis myocutaneous; VHR = ventral hernia repair; WRS = weight reduction surgery.

perioperative management of cardiovascular medications), which we have dubbed a "horizontal pathway" (fig. 1).*

The professional development lectures and quality improvement projects help residents develop leadership skills surrounding change management. Since the initiation of the APCS, residents have developed, with faculty mentorship, the care pathways that have expanded our service from colorectal surgery patients to now include surgical oncology, abdominal wall reconstruction, surgical weight loss, breast reconstruction, living donor nephrectomy, gynecologic oncology, cystectomy, and nephrectomy. The APCS serves to teach anesthesiology residents the experiences and skills needed to lead and manage large institutional changes—in this instance around care redesign.

The Future State of Residency Training

Anesthesiology is at a crossroads. Our specialty faces the opportunity and challenge of continuing to drive innovation and extend our long history of improving patient safety, all in an era of rising patient expectations and increasing financial stressors. Currently, based on our own survey of program directors, a few residency programs offer distinct experiences exposing trainees to perioperative medicine.† Our experience demonstrates that creating and implementing a PSH training curriculum is feasible as we prepare the next generation of anesthesiologists to lead our specialty. In addition to teaching care redesign skills, our APCS has reduced the resource length of stay by 1 full day (by approximately 25%) for patients undergoing colorectal surgery at our institution—a material benefit recognized by hospital leadership and patients alike.[7,8] The creation and expansion of the APCS places our trainees at the center of the people, process, and technology change management challenge, as the development of the service encroaches on domains usually occupied by surgical trainees and faculty. Important lessons in collaboration, innovation, and accommodation were learned all around, but the APCS has ultimately been welcomed by many surgical disciplines and by hospital administration at our institution as an important contributor to perioperative system value.

The most important lessons for our trainees were the fundamental ones at a time of forced innovation: how to be agents of change and how to create a new model of care that had not previously existed in our setting. Was this a once in a lifetime opportunity? Hopefully not. By emphasizing the development of leadership skills, basic tenets of quality improvement, and strategies to manage change, our goal is to graduate waves of anesthesiologists ready to meet the challenges and opportunities of the future of anesthesiology and perioperative medicine.

* A fully realized Perioperative Surgical Home effort can comprise many verticals, each addressing distinct patient populations, and horizontals, applicable to many or all patients.

† King AB, McEvoy MD, Fowler LC, Wanderer JP, Sandberg, WS. Unpublished results, September 2015.

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Competing Interests

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