Anesthesiologists and Healthcare Redesign

Time to Team Up with Experts

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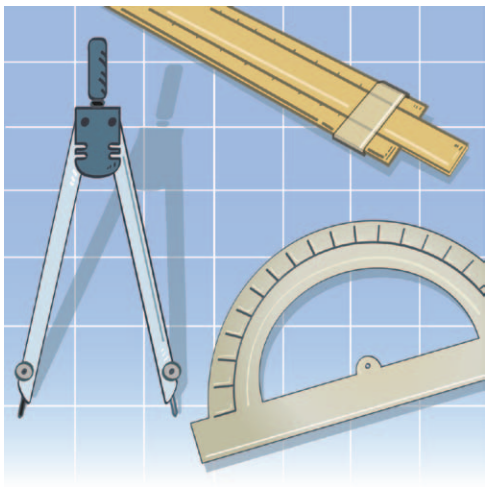
Dear Optimist and Pessimist: while you argued over the state of the glass, I drank the water.

The Opportunist



"We must increase the scientific rigor with which we approach care redesign."

THE landscape of medical practice in the United States is changing rapidly and in ways that make it difficult to predict what we will be doing tomorrow, let alone several years in the future. We are getting a clear message that the growth in the costs of health care is unsustainable and that we must move from a fee-for-service system to a more global system of payment that rewards good patient outcomes. There is no road map for navigating this new landscape. It is a tumultuous period, with new ideas and experiments of all kinds being launched continually and competing for attention. In the perioperative environment, where an enormous fraction of the expenditures in health care are concentrated, we are all under tremendous pressure to squeeze more value from the system. Value has been defined by our business colleagues up the Charles River as quality divided by cost, better patient outcomes at the same or lower cost.[1] We (J.P.R. and W.S.S.), along with numerous colleagues across the country and in numerous practice settings, have led groups assembled to improve the way we deliver care.[2,3] Almost 3 yr ago, Dr. Rathmell proposed that Anesthesiology host a symposium during the 2015 American Society of Anesthesiologists Annual Meeting to highlight this rapidly growing area, perioperative or periprocedural care redesign, where anesthesiologists across the country are now widely involved. We wanted to see some of the best experiments up close, and we hoped to see some hypothesis-driven science that would make its way to full-length articles in Anesthesiology where others could learn from successful and carefully conducted care redesign work. What did we learn?

First, given their organizational positions at the nexus of periprocedural medicine, anesthesiologists appear to be uniquely positioned to participate in care redesign, should they choose to, and they could have a tremendous impact on patients in a number of different realms. Anesthesiologists submitted more than 300 abstracts describing a wide range of care redesign. We chose 12 of the best projects (table 1) to be presented orally during the symposium, and we encouraged all of those selected to submit full-length articles detailing their work. The symposium was a success: standing room only, high-quality presentations, and tremendous interest from the audience. We heard about topics ranging from a new and unique functional restoration program for U.S. soldiers with chronic pain to the impact of preoperative assessment on subsequent perioperative mortality, all the way down to using the electronic anesthesia record to automatically message anesthesiologists in the operating room about how to manage their diabetic patients. The abstracts reported real efforts to improve patient care without adding expense by teams that included anesthesiologists, and at least at the abstract stage of preliminary data, we were seeing very real improvements in patient care.

The symposium left us excited about potential articles. We were confident that we would see a solid collection of original research articles fully describing these care redesign experiments along with rigorous analyses of outcomes, and we expected to publish a full issue of the journal dedicated to showcasing these novel projects. We served as the lead editors for review of each article submitted. Just a handful of articles trickled in. Those that did arrive demonstrated just how difficult the analysis of care redesign will be and the immaturity of this field among anesthesiologists. Most of the articles described poorly controlled or uncontrolled (and likely, uncontrollable) experiments. Few even stated testable hypotheses, and all were plagued with so many confounders that determining the cause and effect was all but impossible.

To the care redesign team, the outcome speaks for itself and the actual critical causative factor might seem unimportant.

ImagePower Productions, John Ursino.

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Table 1. List of Invited Speakers and Abstract Presenters for the ANESTHESIOLOGY Journal Symposium 2015: The Anesthesiologist and Health Care Redesign

Symposium Speakers

Using Data to Improve Operating Room Throughput
Peter F. Dunn, M.D., Massachusetts General Hospital, Boston, Massachusetts
Retsef Levi, Ph.D., MIT Sloan School of Management, Cambridge, Massachusetts

Redesigning Surgical Patient Care from Decision to Discharge
Jonathan P. Wanderer, M.D., Department of Anesthesia, Critical Care and Pain Medicine, Vanderbilt University School of Medicine, Nashville, Tennessee

Designing a New Hospital for Surgical Care
Brett A. Simon, M.D., Ph.D., Memorial Sloan Kettering Cancer Center, New York, New York

Oral Abstract Presentations

Effect of Ongoing Process Improvement on an Enhanced Recovery after Surgery Pathway for Colorectal Surgery Patients
Adam B. King, M.D., Jonathan Wanderer, M.D., Timothy Geiger, M.D., Vikram Tiwari, Ph.D., Warren S. Sandberg, M.D., Ph.D., Matt McEvoy, M.D., Vanderbilt University Medical Center, Nashville, Tennessee

Impact on Cost and Cost Variation of a Surgical Home for Nephrectomy Cases
Shermeen B. Vakharia, M.D., M.B.A., John Patton, Jr., Ross Moskowitz, M.D., Kwang Pak, B.S., Zeev N. Kain, M.D., M.B.A., Joseph B. Rinehart, M.D., University of California, Irvine, School of Medicine, Irvine, California

Preoperative Evaluation Clinic Visit Decreases Risk of In-hospital Postoperative Mortality
Jeanna D. Blitz, M.D., Samir M. Kendale, M.D., Germaine Cuff, D.Phil., Andrew D. Rosenberg, M.D., New York University School of Medicine, New York, New York

Effect of Implementing an Enhanced Recovery after Surgery (ERAS) Pathway *via* Perioperative Consult Service for Bariatric Surgical Patients
Matthew D. McEvoy, M.D., Adam B. King, M.D., Matthew D. Spann, M.D., Vikram Tiwari, Ph.D., Warren S. Sandberg, M.D., Ph.D., Jonathan P. Wanderer, M.D., Vanderbilt Medical Center, Nashville, Tennessee

Medical Follow-up in the Year after Surgery and Subsequent Survival among a National Cohort of Surgical Patients
Robert B. Schonberger, M.D., Feng Dai, Ph.D., Cynthia A. Brandt, M.D., M.P.H., Matthew M. Burg, Ph.D., Yale University, New Haven, Connecticut

Total Joint Replacement Perioperative Surgical Home Program: Impact of Patient Characteristics and Comorbidities on Postoperative Length of Stay
Kyle S. Ahn, M.D., Ran Schwarzkopf, M.D., Joseph B. Rinehart, M.D., Maxime Cannesson, M.D., Ph.D., Zeev N. Kain, M.D., M.B.A., University of California at Irvine, Orange, California

The Impact of Perioperative Systems Design on Diabetic Patient Outcomes
Jesse M. Ehrenfeld, M.D., M.P.H., Jonathan P. Wanderer, M.D., Maxim Terekhov, M.S., Brian S. Rothman, M.D., Warren S. Sandberg, M.D., Ph.D., Vanderbilt University, Nashville, Tennessee

Compliance with Surgical Care Improvement Project for Body Temperature Management (SCIP Inf-10) Is Associated with Improved Clinical Outcomes
Andrew V. Scott, B.S., Jerry Stonemetz, M.D., Jack O. Wasey, B.M., B.Ch., Daniel J. Johnson, B.S., Richard J. Rivers, M.D., Colleen Koch, M.D., Steven M. Frank, M.D., Johns Hopkins School of Medicine, Baltimore, Maryland

Hospital Variability in the Postoperative Management of Patients with Obstructive Sleep Apnea
Sanjana A. Malviya, B.S., Sanjay Menon, B.S., Angela Lyden, M.S., Satya-Krishna Ramachandran, M.D., University of Michigan Health System, Ann Arbor, Michigan

Care Redesign and Non-OR Anesthesia (NORA): A Strategic Imperative---The Data Speak
Wendy L. Gross, M.D., Evan J. Blaney, M.D., David Preiss, M.D., Jason D. Stewart, M.D., Christopher Chen, M.D., Dennis McNicholl, D.O., Richard D. Urman, M.D., Joshua C. Vacanti, M.D., Andrew R. Bond, M.D., Robert N. Pilon, M.D., Brigham and Women's Hospital, Boston, Massachusetts

U.S. Navy's First Functional Restoration Pain Program: Improving Readiness, Restoring Function, and Relieving Pain
Steven Hanling, M.D., Sheila Medina-Torne, M.P.H., Parisa Nahavandi, B.S., Kathleen McChesney, Psy.D., Meredith Schumacher, D.P.T., Tara Sheridan, M.D., Ana Texidor, R.N., Ivan K. Lesnik, M.D., Naval Medical Center San Diego, San Diego, California and University of Washington, Seattle, Washington

The Use of Transthoracic Echocardiography Performed Preoperatively by Anesthesiologists in Perioperative Medical and Surgical Planning
Daniel P. Walsh, M.D., Julie Hoffman, R.N., Sasha K. Shillcutt, M.D., University of Nebraska Medical Center, Omaha, Nebraska

But, when viewed as a scientific experiment where others hope to reproduce the same results, a more critical and well-controlled experimental design is necessary to understand the cause and effect. And that is exactly where most care redesign projects fail to meet the standard necessary for publication as original research. Most of the projects were done as "let's make a change and watch the outcomes" before/after designs sufficient to inform managerial decisions about the project's success. By the time the abstracts were submitted and the articles were written, these projects were done, and the investigators and parent organizations had moved on, in some cases by years. The analytical flaws would never be overcome. Finally, confirmation bias—a tendency to search for data that support one's own preconceptions—and publication bias—some studies, particularly those with positive findings, are more likely to be published—are likely to be strong. Taken together, all of these limitations do not bode well for the current wave of care redesign research achieving publication in scientific journals. Hypothesis-driven, well-controlled scientific experiments in care redesign are uncommon, at least among those participating in this symposium. After years of effort to publish scientific experiments that would demonstrate the effectiveness of the well-described but unproven concept we call the Perioperative Surgical Home, this is exactly what Shafer[4] concluded: "Missing from this collection are data showing improved outcomes, cost reduction, or successful implementation of any of the 'triple aims' of the Perioperative Surgical Home. Where are the data? Opinion, reflection, and dialogue are important. …However, opinion is not a substitute for data."

We do want to thank all of the enthusiastic investigators who took part in the care redesign symposium. You are all doing important work that is (probably) improving the care of your own patients. We offer something of an apology to those of you who tried and failed to get more in-depth, full-length articles detailing your work published in Anesthesiology. We are only partially apologetic though because many of those experiments just did not meet the standard for reproducible scientific experiments that create new knowledge.

So, as anesthesiologists interested and involved in these healthcare redesign projects, where are we going wrong? We must increase the scientific rigor with which we approach care redesign. At the outset, at the beginning of a project, we need to pose a testable hypothesis and think carefully about how we can best control the many variables that, if left uncontrolled, will make it difficult to discern any clear answers. The same financial pressures cited above make this difficult—everyone is looking for quick solutions and then moving on to the next crisis. However, scientific rigor in care redesign is just as important as it is in drug and intervention studies. More than money is at stake. Wholesale redesign of clinical care systems does impact patient outcomes; we just do not always carefully measure the results. On the flip side, diversion of resources to implement new care designs that may not actually improve care may just be a waste and consume energy and resources that could be better used in other patient care activities.

Clinical care redesign is occurring constantly, and it impacts patient outcomes just as much as new diagnostic and therapeutic techniques. These ideas spread virally through the healthcare delivery system. For example, the operating room of the Future Project was the inspiration for a parallel processing OR project in Finland[5] and another at the Cleveland Clinic,[6] as well as others,[7] with the parallel processing concept eventually reappearing at the original institution.[8] There is every bit as much obligation for investigators to conduct rigorous research in this area as any other, but we are concerned that it just will not happen. Nothing prevents us from wholesale system-wide experimentation in care redesign, and because there are strong economic pressures to do so, it is likely that there will continue to be an exuberant and unpublished (but promulgated) river of activity throughout health care to change the way we do things to adapt to economic conditions. Moreover, publication in the lay press of untested claims for early-stage ideas with strong economic incentives appears to be happening and may serve the claimants' objectives (financial and reputational gain) very well.[9] This should concern the scientifically oriented among us because health outcomes are assumed to improve but they may not. Care redesign is now an important part of our everyday lives, and we stand to learn tremendously from one another if we take the time to carefully design meaningful experiments and then meticulously measure and report our findings.

Throughout this editorial process, we learned of many opportunities (that had passed by) in which anesthesiologists might have designed rigorous experiments around care design initiatives that were going to happen, no matter what. Maybe we are not the experts we hold ourselves out to be in this arena. There is a well-established field called process engineering, and these engineers conduct operations research devoted to systematic study and improvement of poorly performing processes. Why continue the myth that anesthesiologists somehow have the knowledge and skills to conduct real process engineering? By partnering clinical experts and process engineering experts, data-driven strategies for improving operational efficiency can be successful. In one recent partnership example, overall OR capacity was improved by 9% by identifying and systematically improving the causes of hospital congestion that backed up into the OR.[10] In another partnership example, researchers developed and validated a technique to predict daily day-of-surgery OR volume for specific days, reliably 2 wk in advance. This allowed the anesthesiology department to save $1M per year in staffing costs.[11] Let us stop pretending to be experts in process redesign and start building teams, including process engineers and operations researchers who have the expertise to study and rationally redesign our broken processes in health care. To generate more than position

pieces, anesthesiologists must anticipate, catch these opportunities, and exert the effort to partner with experts and lead the science.

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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