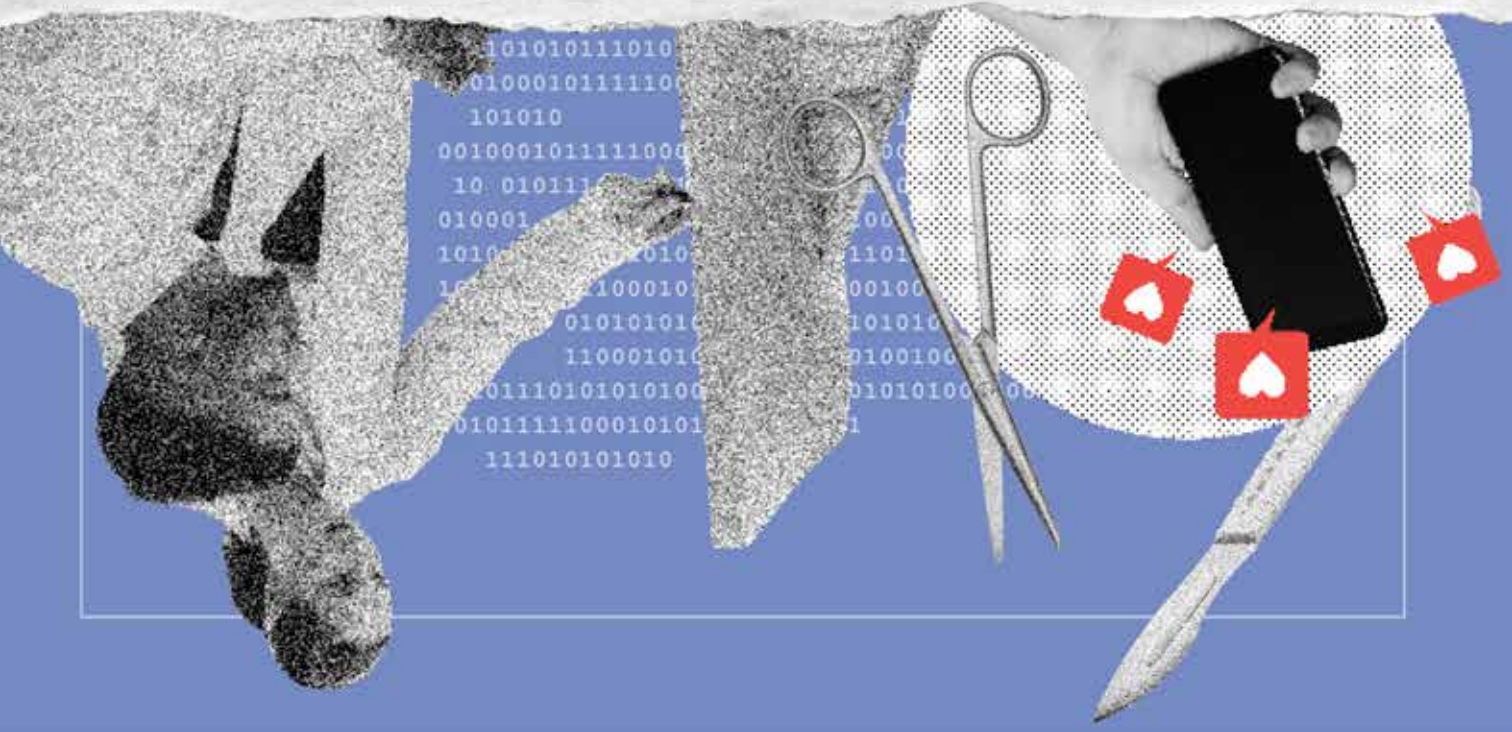


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Bulletin of the American College of Surgeons (ISSN 0002-8045) is published monthly by the American College of Surgeons, 633 N. Saint Clair St., Suite 2400, Chicago, IL 60611-3295. It is distributed without charge to Fellows, Associate Fellows, Resident and Medical Student Members, and Affiliate Members. Periodicals postage paid at Chicago, IL, and additional mailing offices. POSTMASTER: Send address changes to *Bulletin of the American College of Surgeons*, 633 N. Saint Clair St., Suite 2400, Chicago, IL 60611-3295. Canadian Publications Mail Agreement No. 40035010. The American College of Surgeons headquarters is located at 633 N. Saint Clair St., Suite 2400, Chicago, IL 60611-3295; tel. 312-202-5000; toll-free: 800-621-4111; email: postmaster@facs.org; website: facs.org. The Washington Office is located at 20 F Street NW, Suite 1000, Washington, DC 20001-6701; tel. 202-337-2701.

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Printed in the USA.

The Future of the Surgical Profession

Patricia L. Turner, MD, MBA, FACS

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THERE ARE MANY THINGS WE cannot fully predict about the future of surgery. An element of uncertainty is unavoidable in knowing when, which, and how new technologies will transform our work, how compensation for our care will be calculated, and what career achievements each of us might ultimately attain.

One thing is certain: each year, without fail, a new class will graduate from medical school and enter surgical residency, and a corresponding group will complete residencies and fellowships to become

attending surgeons. We cannot predict the future—but we can meet the future personally, by knowing, engaging, and welcoming the next generation of our surgical colleagues.

At the ACS, we strive to know our trainees well. I am proud that the College maintains a strong focus on supporting residents and fellows as they progress through training and establish their careers.

For example, we have developed extensive resources that are meant to complement the education they receive in residency or fellowship. These offerings include educational webinars, scholarships and grants, virtual hangout sessions for informal discussions, and more (available at facs.org).

We do not stop at offering resources. Rather, we incorporate resident voices into the work of the ACS by inviting nearly 80 liaisons from our Resident and Associate Society (RAS) into scores of decision-making meetings each year—and not merely as observers. For example, the current RAS chair, **Julia R. Coleman, MD, MPH**, attended our most recent Board of Regents meeting and later commented, “I couldn’t

even count the number of times that, in this room full of those whom I consider the surgery leaders of the world, they would ask, ‘Dr. Coleman, what do you think of this from the RAS perspective?’”

That perspective is incredibly useful. Residents represent the future of our profession, and their participation helps the entire House of Surgery know not only what is relevant to them today, but also what viewpoints are likely to be pivotal in the future.

In fact, the current cohort of graduating residents may make a distinctive contribution to our collective future by virtue of their unique position. Those completing residency now have faced distinct challenges in the formative years of their careers, including spending part of their training near the frontlines of a global pandemic.

They are also beginning their careers amidst multiple transformations in the profession such as changes in how quality and performance are measured, shifting healthcare payment models, and burgeoning but potentially unsettling use of artificial intelligence and machine learning, all against the backdrop of ballooning student debt.

Training to become a surgeon during these seismic shifts provides this cohort unique perspectives relevant to them, to surgical residents who will come after them, and to more established colleagues—in short, to all of us.

It is possible for us to have a strong understanding of surgical residents because so many participate in the ACS. There are now 17,000 members of RAS, including 13,000 surgical residents and 4,000 Associate Fellows (who are in their early careers after residency, but before ACS Fellowship). These numbers have grown by nearly 3,000, in part, because we are 2 years into a pilot project offering free membership to all surgical residents of all specialties and disciplines. We anticipate that enhanced resident participation will lead to more Fellows in practice who recognize the inherent value of membership in the ACS.

Engagement also continues to increase. For example, the annual Leadership & Advocacy Summit in Washington, DC, this April had more participation from RAS members than in previous years, and RAS members collectively contributed more funds than ever before to SurgeonsPAC, the ACS political action committee that advocates for surgeons and surgical quality. We sincerely appreciate their support and participation in the political process—not least of all because we know that early career surgeons are most likely to see the impact of legislative changes over time. The residents seem to inherently recognize that no one is going to love everything about any candidate in any political race, but engaging in the process

and exerting broad influence on behalf of surgeon colleagues and our patients benefits us all.

Of course, we all hope for a future full of wisely used technologies, fair and reasonable pay, and fulfilling career achievements. Alongside the work you do to secure that future, I urge you to engage yourself and any residents you know with the ACS. To do so will help cement the legacy of this organization for the next generation—and as Abraham Lincoln once said, “The best way to predict the future is to make it.”

If you are a resident, your free membership includes registration for Clinical Congress (if you register by early October). Offerings specifically for residents include the 2-day Surgery Resident Program (Sunday, October 22–Monday, October 23) and Surgical Jeopardy, a fun competition that is often among the conference’s most highly attended events (Wednesday, October 25, 8:00–11:45 am). In addition, the RAS Business Meeting (Tuesday, October 24, starting at 12:00 pm) is open to all

Training to become a surgeon during these seismic shifts provides this cohort unique perspectives relevant to them, to surgical residents who will come after them, and to more established colleagues—in short, to all of us.


This Month’s Issue

We share the insights of residents through the August issue of the *Bulletin*. This year, please see articles by RAS members detailing the impact of online communication platforms (pages 8–13), the transition from resident to attending surgeon (pages 34–39), and more.

Join Us at Clinical Congress

If you are interested in knowing about any aspect of the current state or the future of surgery, Clinical Congress is a great place to find out more. This year, we will meet in Boston, Massachusetts, from October 22 to 25.

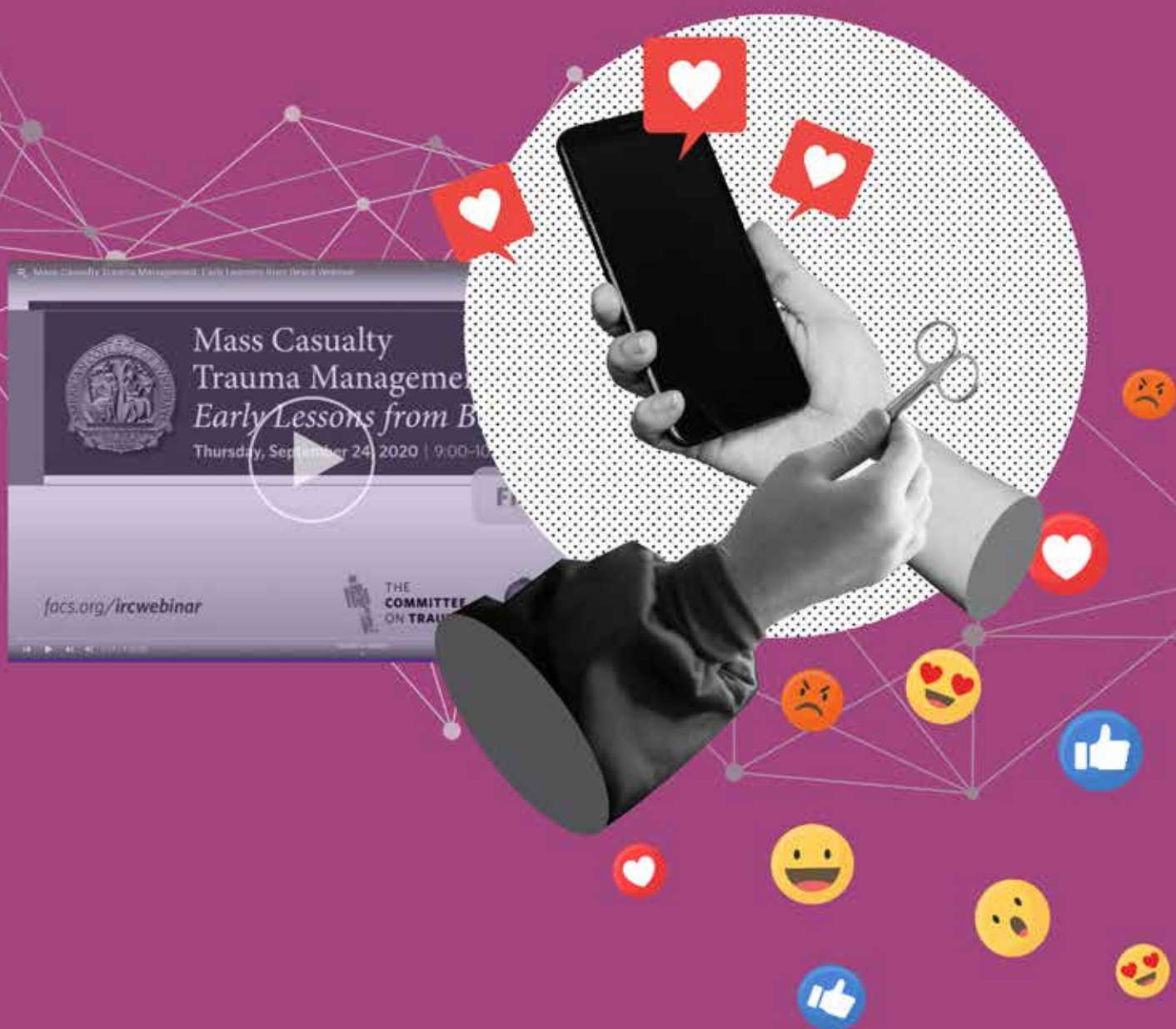
interested in learning more about or becoming active in RAS.

For surgeons at every stage of their careers, Clinical Congress offers hands-on Skills Courses, Didactic Courses, Panel Sessions, Named Lectures from iconic leaders, and Scientific Forum sessions on a tremendous range of topics, relevant to surgeons of every specialty and in every practice setting. Find out more and register at facs.org/clincon2023. 

Dr. Patricia L. Turner is the Executive Director & CEO of the American College of Surgeons. Contact her at executivedirector@facs.org.

Social Media Influences Surgical Training

Fedra Fallahian, MD
Thomas Wyatt, DO
Katie Carsky, MD
LaDonna Kearse, MD





The rapid advancement of communication platforms, particularly social media, has revolutionized the way we connect, interact, and share information.

FROM PERSONAL CONVERSATIONS TO global collaborations, these platforms have fundamentally transformed the landscape of communication across various domains. One area that has been influenced profoundly by this digital revolution is surgical training.

Surgical training has long relied on traditional methods, such as didactic lectures, hands-on experiences, and mentoring by experienced surgeons. However, the emergence of communication platforms has ushered in a new era of learning and knowledge dissemination.

Social media platforms, with their immense reach and accessibility, have provided surgeons and trainees with unprecedented opportunities to share their experiences, exchange ideas, and engage with a global community of medical professionals. Notably, many surgical training programs have their

own Twitter accounts, allowing them to engage with trainees, attendings, and medical students.

This article explores the impact of communication platforms, primarily social media, on surgical training, while also examining the related benefits, challenges, and ethical considerations. It delves into the transformative effects of these platforms on various aspects of surgical education, including knowledge acquisition, skill development, collaboration, mentorship, and professional networking.

The Educational Impact of Communication Platforms

Many different surgical specialties and disciplines, including urology, plastic surgery, and neurosurgery, have adopted social media to enhance their educational programs, technical training, and research opportunities.¹⁻³

This article was written before the social media platform formerly known as Twitter changed its name to X.

It has been shown that social media rarely negatively influences applicants' perceptions of a program, so creating and maintaining social media platforms are likely worthwhile for residency programs.

A Twitter user may ask a question to their own target audience, focusing in with a hashtag or Twitter handle, and retrieve guidance from others. In all capacities, whether through a simple question, chatroom, or formal meetup, Twitter has facilitated mentorship for hundreds, if not thousands, of surgeons and aspiring surgeons worldwide.

Communication Platforms during COVID-19

Many surgical disciplines also have been using social media as a recruiting tool since before the pandemic. Among orthopaedic surgery applicants who completed a survey, Instagram was found to be the most-used social media platform to learn about programs.⁹

Similarly, most integrated plastic surgery applicants who participated in an optional survey found that social media was an effective source of information on programs, with the majority of respondents using Instagram in particular.¹⁰

Since 2020, the social media accounts of general surgery residency programs have grown in popularity. While the idea of using social media as a recruitment tool is not new, it has new importance in the age of virtual interviews that have followed the pandemic.

Of note, there was a significant increase in residency social media accounts in 2020. During the 2020–2021 application cycle, most general surgery applicants reported using social media to learn about residency programs. It has been shown that social media rarely negatively influences applicants' perceptions of a program, so creating and maintaining social media platforms are likely worthwhile for residency programs.¹¹

In addition to fundamentally altering residency recruitment practices, the pandemic also threw into disarray many of the standard training techniques, including real-time instruction both in the operating room and simulation labs.

As many elective cases were canceled and face-to-face teaching was postponed, much of the traditional training methods were no longer available. A survey of surgical trainees during COVID-19 found that most institutions introduced new education and training solutions to the challenges brought on by the pandemic, including transitioning educational programming to a virtual format and recording lectures for later viewing; 21% of residents reported a positive or extremely positive impact on their didactic experience during this time.¹²

Innovative residency programs began to use communication platforms to directly facilitate surgical technique training. Loli and colleagues implemented telementoring into their surgical curriculum by using smartphone cameras to record EndoTrainer practice, allowing trainees to receive real-time feedback from mentors. All 40 participants who participated in the study reported this use of telementoring to be a “good educational tool.”¹³

Communication Platforms and the Spread of Misinformation

While communication platforms offer undeniable advantages in surgical training, they also present several challenges and ethical considerations that must be addressed. Issues such as patient privacy, the reliability of shared information, and potential misinformation necessitate careful evaluation.

Social media has been touted as a way to improve the visibility of medical literature but there can be






a selection bias in what is chosen to be publicized and what gains the most traction online.



As providers share anecdotal evidence related to specific presentations, it is important to be cognizant of a lack of peer review that would otherwise be expected for scientific findings.

There are examples of misinformation shared by physicians online, particularly surrounding antivaccine rhetoric,¹⁴ which is easily spread without any type of fact-checking process. Medical providers who share their experiences online may inadvertently include protected health information and be in violation of HIPAA, resulting in a loss of employment.¹⁵

For this reason, the American Medical Association and other healthcare associations have developed guidelines for professionalism in social media.¹⁶ Balancing the benefits with the potential risks and ensuring responsible use of these platforms are essential aspects that require in-depth examination.

It is crucial to examine the unique attributes that communication platforms bring to surgical training. Unlike traditional methods, which often restrict learning opportunities to local or limited networks, social media platforms offer a global stage for surgeons and trainees to connect, share experiences, and learn from each other's diverse perspectives.

Furthermore, the multimedia capabilities of these platforms allow for the seamless exchange of surgical videos, images, and educational resources, enhancing the understanding of complex procedures and techniques. At the same time, it is important to consider the possible negative consequences of these platforms and strive to maintain accuracy, credibility, and professionalism throughout all communications.   

Dr. Fedra Fallahian is a 2023 graduate from the Saint Louis University general surgery residency program in Missouri. She is an incoming fellow in breast surgical oncology at The University of Texas-Southwestern in Dallas and serves as Chair of the ACS-RAS Communications Committee.  

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Newly Released Breast Cancer Treatment Standards

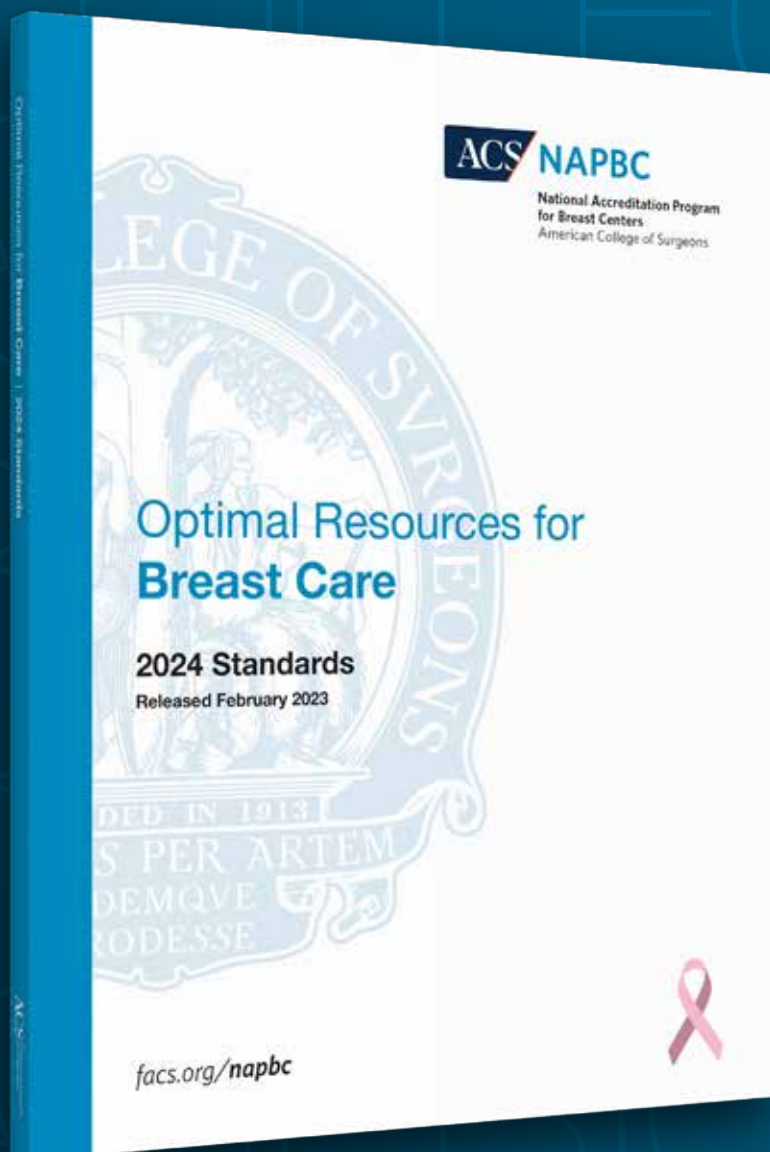
The National Accreditation Program for Breast Centers (NAPBC) has launched updated accreditation standards for 2024, the *Optimal Resources for Breast Care (2024 Standards)*.

The new standards feature extensive revisions focused on:

- The patient care journey from screening and prevention to diagnosis, treatment, and survivorship
- Providing value-based care with multidisciplinary support
- Usability and ease of implementation

LEARN MORE

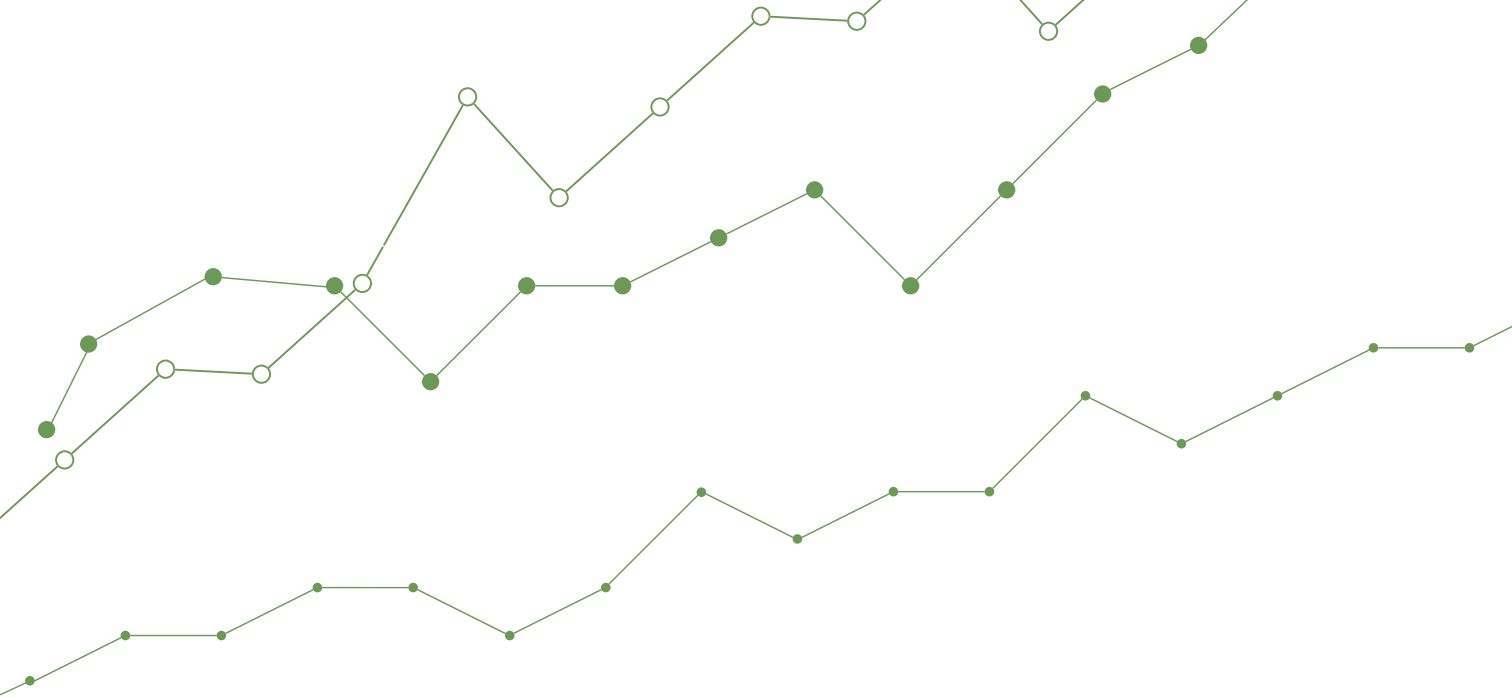
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Future of Surgical Training Will Include Major Shift in Education Model



Rachel E. Hanke, MD
Joyce H. Pang, MD
Brianna L. Spencer, MD
Erfan Faridmoayer, MD
Aaron E. Tipton, MD
Madhuri Nagaraj, MD



To look toward the future, we must understand our past—and the history of surgical education features milestones highlighting significant evolution.

IN THE MID-16TH CENTURY, medical apprentice training began at around 13 years of age under a single mentor. This process involved direct observation and imitation of skills in a clinical environment for 5 to 7 years, which was followed by independent practice. There was no regulation on the requisite skills, structure of training, or oversight after independent practice.

Over time, the development of the Halstedian pyramidal, graduated autonomy residency model, and the formation of medical boards provided a necessary structure for surgical training. The evolution of standardization across hospitals and residency review committees and a shift to competency-based education have propelled us into the modern era.¹

So, where do we go from here? The future of surgical education depends on surgeon leaders

recognizing the challenges inherent in acquiring a massive amount of requisite knowledge and skills in an expedited amount of training time.

Rather than a linear “see one, do one, teach one” model, trainees are expected to evolve in multiple domains simultaneously to become well-rounded physician surgeons (see Figure 1, page 16). Surgical educators will need to plan beyond acquisition of technical skills and medical knowledge to emphasize the value of ongoing self-reflection and feedback, increase specialized certification, and encourage the development of nontechnical skills.

We will see another major shift in the training model, moving from assessing the adequacy of training based on time and case numbers, toward a full holistic review of how the trainee performs at all core competencies in the setting of the larger healthcare system.



Developing Technical Skills

As the modern world has evolved with the growing integration of technology in daily life, so has medicine, surgery, and surgical education. Previous skill acquisition was relegated to the “present” with apprenticeship models or even simulation practice.

The future integration of technology will allow us to “train from our past” by making resources to record, analyze, and review procedures universally. Indeed, the current applications of multimedia-based training have been found to significantly improve the surgical performance of fellows and the education of students.²

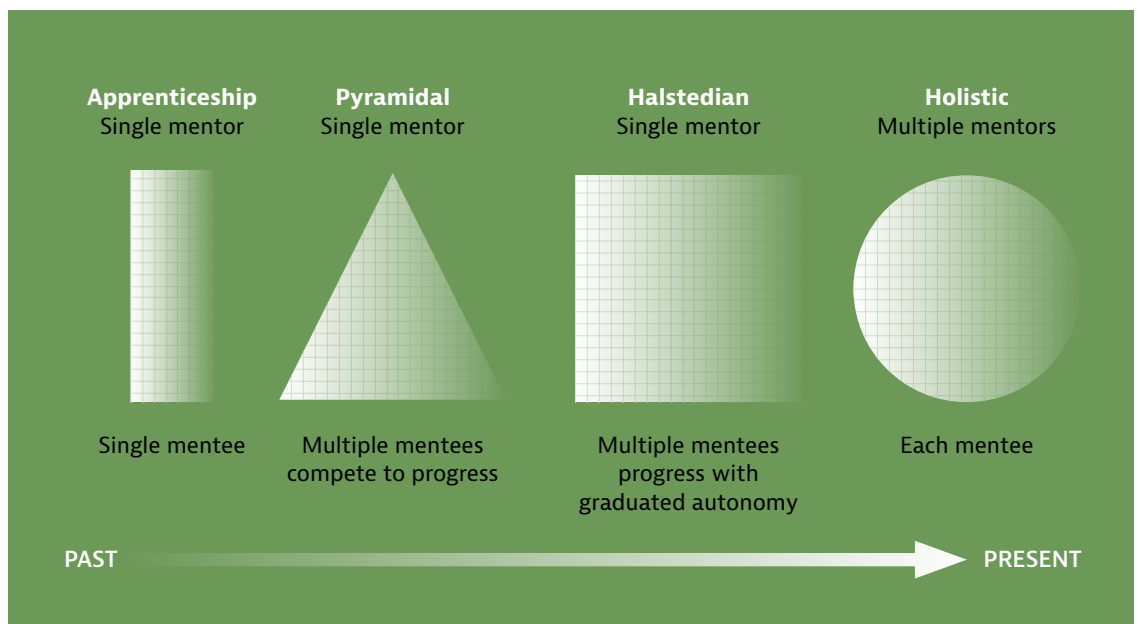
These systems will grow to be seamlessly integrated into training and provide a variety of benefits. Video and audio recordings can be obtained for entire cases, and editing software may

be used to condense these videos into highlights that focus on key aspects of a procedure.

Trainees typically will have immediate access to data that will facilitate self-reflection with longitudinal records to monitor their progression. Furthermore, these videos will allow for feedback and coaching mechanisms from surgical educators regardless of time or space and will allow the trainee to develop higher-level competencies targeted toward certification and, ultimately, quality improvement.

Technology in the operating room (OR) also has been applied to surgical safety with the creation of the OR Black Box. The term “black box” comes from the aviation industry where technology is used to collect comprehensive flight data and real-time monitoring. From this information, risk can be

Figure 1. Progression of Surgical Training Model Over Time



As the modern world has evolved with the growing integration of technology in daily life, so has medicine, surgery, and surgical education.

mitigated, and accidents can be reviewed to develop strategies to identify and avoid future events.

Our current model of operating room safety relies on subjective factors such as retrospective review and self-reported morbidities and mortalities. Going forward, identifying one's objective metrics can be standardized with data collection from wall-mounted cameras, microphones, and video feeds from laparoscopic instruments for general surgery cases. Early studies found an average of 20 errors per case, usually during the dissection and reconstruction portion of cases, and an average of 138 auditory distractions.³

Future surgical trainees will be expected to master their technical skills using clinical and simulation training, supplemented by video-based review, in order to evaluate their performance while identifying areas for improvement. Current barriers for developing this process on a wider scale include the cost to integrate such technology and the acceptance of a coaching model of ongoing surgical training.

Assessing Technical Skills

As the number of technical competencies increases, so must the procedures for learning and for verification of these skills. While the Fundamentals of Laparoscopic Surgery (FLS) and Fundamentals of Endoscopic Surgery (FES) programs are now required for the General Surgery Qualifying Exam, there is no standardization for when these certifications should be completed or a consensus regarding the required surgical simulation curriculum.⁴

Moreover, comfort in a simulation environment can predict improved performance but not guarantee mastery of the operative environment for laparoscopic, endoscopic, or robotic procedures.

Indeed, there are subtle technical nuances that only are gained through supervised real-time operative exposure with appropriately

increasing resident autonomy. To facilitate this learning curve, programs may lean toward an early introduction of the FLS and FES curricula, allowing more time for mastery of advanced skills through the remaining residency years and by increased faculty comfort levels regarding resident autonomy.

Simulation in surgical education needs to parallel the growth in the variety and sophistication of surgical technology over time.

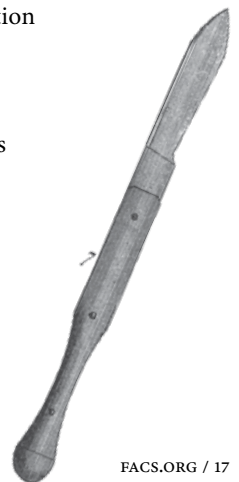
Laparoscopic surgery has dominated procedures in private and academic centers; yet since its introduction in 2004, the FLS curriculum has not been adapted to parallel this increasing complexity. Recent evidence of a high FLS first-pass rate of 96% belies the need for curricula to match the increasing complexity of trainees' laparoscopic case exposure and the skillset required of a graduating general surgery resident.⁵

Development or alteration of new modules, however, should carefully consider their value in lieu of a trainee's clinical responsibilities, financial burdens, and mental well-being. Added certifications without appropriate educational value will, without a doubt, have a negative impact.

Importance of Soft Skills

The present shift to patient-centered healthcare will lead to the future reorientation of surgical education and the establishment of an ideal "professional" surgeon. There is growing awareness that these effective surgeons must possess nontechnical skills (NTSs) or soft skills to engage with patients and colleagues, and undergo formal training and assessment of NTSs.

NTSs have been defined in various ways, most commonly as "the cognitive and social skills that characterize high-performing individuals and teams."⁶ These skills are frequently organized into three distinct categories: cognitive (e.g., decision-making, situational awareness);



interpersonal/social (e.g., communication, teamwork, leadership); and personal (e.g., overcoming burnout, managing fatigue).

In the last decade, the importance of NTSSs for patient care has been demonstrated extensively, with studies showing that the majority of surgical complications result from deficiencies in NTSSs (e.g., communication breakdown) rather than technical errors.⁷

Formalized training and validated assessment tools of NTSSs for surgeons and surgical trainees also have been studied. The most widely studied and validated tool is the Non-Technical Skills for Surgeons (NOTSS) system. A modified version of this framework, the NOTSS-US, has been studied as an assessment for trainees in the US.⁸

The NOTSS and NOTSS-US systems focus on four areas: situation awareness, decision-making, communication and teamwork, and leadership. Each of these categories is further broken down into specific elements (e.g., exchanging information, coping with pressure).

A trained rater uses this tool to assign the trainee a rating for each relevant skill per case after which feedback and discussion should identify areas for improvement. While NOTSS focuses on a surgeon in the operating room, other modified assessment tools have been developed to evaluate the surgical team as a whole (surgeon, anesthesiologist, and nurses) or a surgeon in the trauma resuscitation environment.

In trainee studies, the NOTSS-US was found to correlate with postgraduate year.⁹ This suggests that, similar to technical skills, there should be an expected graduated improvement of NTSSs and formal incorporation into training. In the current framework, NTSSs fall within the individual competencies of professionalism and interpersonal communication milestones that residents are expected to aim for prior to graduation. As the transition to more holistic competency-based training occurs, NTSSs will be incorporated into formalized training as a foundational part of surgical training within the next decade.

Paradigm Shift in Assessment

Our trainees are now expected to master open, laparoscopic, endoscopic, and robotic surgery. Additionally, they are expected to acquire an ever-expanding knowledge base and demonstrate leadership and communication skills. It is no longer feasible to rely solely on time in training or number of cases to assess a trainee's readiness for independent practice.

So, how will we assess this "future surgeon" who is charged with mastering knowledge, technical skill, and soft skills? This assessment likely will come as the profession transitions into the new paradigm of Entrustable Professional Activities (EPAs).

EPAs initially were developed in the Netherlands for physicians to better determine their deficiencies in competencies. The EPA framework will launch

Table. General Surgery Entrustable Professional Activities (EPAs)

Original EPAs		Additional EPAs	
1	RLQ pain/appendicitis	1	Benign or malignant breast disease
2	Gallbladder disease	2	Benign or malignant colon disease
3	Inguinal hernia	3	Abdominal wall hernia
4	Evaluation/initial management of a trauma patient	4	Acute abdomen
5	Provide general surgery consultation	5	Benign anorectal disease
		6	Small bowel obstruction
		7	Thyroid and parathyroid disease
		8	Dialysis access
		9	Soft tissue infection
		10	Cutaneous and subcutaneous neoplasms
		11	Severe acute or necrotizing pancreatitis
		12	Perioperative care of the critically ill surgery patient
		13	Flexible GI endoscopy




Figure 2. Multifaceted Skills of the Future Surgeon

as an adjunct to the established milestones from the Accreditation Council for Graduate Medical Education.

In 2020, five general surgery EPAs were piloted: evaluation and management of a patient with inguinal hernia; evaluation and managing of a patient with right lower quadrant pain; evaluation and managing a patient with gallbladder disease; evaluation and initial management of a patient presenting with blunt or penetrating trauma; and providing general surgical consultation to other healthcare providers.

Beginning in July 2023, these five EPAs and an additional 13 will be initiated in general surgery programs (see Table, page 18). Together, these 18 EPAs aim to assess the core competencies (knowledge, technical skill, and soft skills) in a standard holistic way.

What will it mean to be a safe, competent surgeon in the future? As the complexity of surgery and patient care changes, so do the implications for surgical training. We are moving beyond simply a focus on the fastest or the most knowledgeable trainee. Surgeons of the future also must be coachable, self-evaluating, professional, efficient, knowledgeable, honest, communicative, well-rested, and inquisitive, as well as possess cognitive, interpersonal, technical, and personal skills (see Figure 2, this page). 

Dr. Rachel Hanke is a pediatric colorectal fellow at Children's National Hospital in Washington, DC.

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H.R.1667 - Dr. Lorna Breen Health Care Provider Protection Act
117th Congress (2021-2022)

Public Law No: 117-105 (03/18/2022)
Dr. Lorna Breen Health Care Provider Protection Act

This bill establishes grants and requires other activities for
behavioral health and health care providers.

Specifically, the Department of Health and Human Services

Champion the Future of Surgical Training by Becoming a Surgeon-Advocate

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Surgeons spend their careers mastering skills to provide exceptional care to patients. Just as surgical proficiency takes time, learning the complexities associated with advocacy work also takes perseverance.

ADVOCACY MAY BE CONSIDERED as distinct of a discipline as surgery is, given the rules, regulations, and legislation governing the practice of healthcare. As members of the surgical profession, we have unique qualifications and experiences that we can bring to policymaking. Therefore, strengthening the development of surgeon-advocates is integral to the surgical training paradigm.

Surgical trainees often function as patient advocates, a role that includes a skillset that easily can translate to political advocacy. Trainees also are the “boots on the ground” in the hospital and have lived experiences that are relevant to effective advocacy. Despite the feeling many trainees have that we cannot effect change because we lack power or authority, our experiences frequently are welcomed by policymakers, and our voice is urgently needed in the advocacy dialogue.

This article details the strategies and approaches that members of the ACS Resident and Associate Society (RAS)—and surgeons in general who may be new to advocacy—may consider to further their development as surgeon-advocates.

History of Advocacy

The evolution of national regulations for residents and healthcare professionals has been accelerated, in part, by two individuals: Libby Zion and Lorna Breen, MD, who are important in historical and contemporary contexts, respectively.

Zion was a young woman who died due to a medication interaction which, at the time, was attributed to overworked resident-physician prescribers. The trial spanned nearly 10 years, but the final result was a 1989 policy in the state of New York limiting resident work to 80 hours per

week and no more than 24 hours at one continuous time.¹ This policy would later be adopted by the Accreditation Council for Graduate Medical Education in July 2003 and now is required for all residency programs across the US.¹

Dr. Breen was an emergency medicine physician in New York City who died by suicide in April 2020, during the initial surge of the COVID-19 pandemic.² Her death brought the issues of physician burnout and suicide into the mainstream media.

Physicians long have had a higher rate of suicide, roughly two times that of the general population.² The death of Dr. Breen, and the surrounding spotlight on healthcare professionals during COVID-19, prompted the federal government to take notice and enact change. The Lorna Breen Health Care Provider Protection Act was signed into law in March 2022.²

The US Surgeon General describes physician burnout as “an occupational syndrome characterized by a high degree of emotional exhaustion and depersonalization (i.e., cynicism), and a low sense of personal accomplishment at work.”³

The Breen Act requires that the US Department of Health and Human Services sets aside grants to promote mental health and resiliency among

healthcare providers.² These policies aim to reduce physician burnout and prevent patient harm or surgeon self-harm due to the stress, both physical and mental, that can accompany the work of our profession.

Call to Action

Early career surgeons are critical for advocating for legislation that impacts the future of surgical training and access to care. We not only have direct involvement with patients and personal experience with systems-based issues but also can provide a first-person account of surgical training.

New policies and regulations frequently are proposed that have the potential to impact the entire surgical community, specifically, the future of the workforce. As the demand for surgical care rises, ensuring availability of quality surgeons to meet this demand is essential.

However, there has not been a compensatory expansion in the number of residency positions, due largely to the caps imposed by the Balanced Budget Act of 1997, resulting in a serious supply and demand imbalance.⁴

By providing support to curb future surgical workforce shortages and advocating for additional

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Specifically, the Department of Health and Human Services (HHS) must award grants

Trainees are the “boots on the ground” in the hospital and have lived experiences that are relevant to effective advocacy.



funding for residency positions, early career surgeons can help ensure that the next generation is adequately prepared to meet the needs of patients.⁵

Surgeons also play a central role in advocating for policies that protect against Medicare and Medicaid payment cuts and ensure fair reimbursement for surgical services. Coding and reimbursement policies are constantly changing. It is not only essential for surgeons to stay informed about these changes, but also to understand the legislative landscape in order to advocate for policies that allow us to provide high-quality care to patients.

Advocacy Shaping Surgical Training

Most of the policies that affect the daily life of a trainee exist at the institutional level. These policies can vary from rotation and call schedules to resident wellness programs and the ability of trainees to prioritize their own health.

There are many life changes that occur during this time that can include alterations in the trainee’s own health as well as changes in the family structure. It is important that trainees have the freedom to schedule appointments for health maintenance, which is often difficult given the existing daily workflow of most surgical departments.

Primary and dental care are vital for all trainees, but other health-related maintenance may include optometry, obstetrics, gynecology, parental, and pediatric care. Additional specialist visits may be needed for acute health needs.

At the institutional level, having a policy in place that safeguards trainees’ access to essential

appointments is essential. Trainees may hesitate to request time off due to feelings of guilt or wanting to avoid the perception that they are pushing the burden of their job onto someone else.

One national survey of urology trainees found that having routine access to medical and dental care was reported as one of the most impactful policies to reduce professional burnout.⁶ An institutional culture that values and prioritizes trainee healthcare can alleviate concerns about work burden. This issue will only increase with the predicted surgeon deficit of more than 30,000 by 2034.⁵

In the wake of COVID-19 and the spotlight that the pandemic placed on physician burnout, the ACS created the Surgeon Well-Being Workgroup and developed a page on the ACS website featuring curated resources.⁷

The goal of the workgroup is to improve overall surgeon well-being. The RAS Advocacy and Issues Committee also has committed to developing new strategies that support resident well-being and maintain a productive training and learning environment.

The workgroup recognizes that the way each training program navigates resident wellness may be individualized; however, governing bodies like the ACS can adopt and promote a framework to focus local interventions.

Another contributor to trainee and surgeon burnout is the financial burden of educational loan debt. The ACS has prioritized advocacy for several pieces of legislation that can directly affect residents and early career surgeons by reducing the burden of

loan debt. The Resident Education Deferred Interest Act allows borrowers to defer payment of loans without accruing interest until the completion of their training program, with the goal of substantially reducing the burden of repayment during training.⁵

The Specialty Physicians Advancing Rural Care Act creates a loan repayment program for specialty physicians practicing in federally designated rural areas by providing up to \$250,000 for up to 6 years of service.⁵ The goal of this legislation is to help address rural access to care issues and encourage new graduates who want to practice in these areas be able to afford the costs of rural practice and still pay back their loans. Both bills have been introduced in Congress and are awaiting legislative action.

and provide surgeons with opportunities for career advancement. The ACS continuously tracks state legislation of interest to surgeons and provides guidance and assistance with state-level advocacy meetings and campaigns.⁸

The ACS also connects state chapters that have achieved advocacy successes to other chapters with similar goals. In addition, the College supports chapter-level advocacy projects through a chapter grant program.⁸ Recently, RAS members have been involved in providing testimony for state-level legislation like STOP THE BLEED® bills, which is a California ACS Chapter initiative.

State advocacy is an opportunity for trainees and young surgeons to learn how advocacy works, gain valuable advocacy skills, and take an active role in leadership.

Ways to Get Involved

Institutional Level

Achieving change at an institutional level typically requires collaborative action between residency and departmental leadership.

Another approach for driving change at this level could include the work of a trainee representative on the administrative boards. Whether the trainee representative interacts with the graduate medical education office, the hospital, or the entire network of institutions, this role can be an effective way to directly bring issues to leadership.⁵

State Level

Getting involved in an ACS chapter is the gateway to state-level advocacy, which can connect surgeons involved in advocacy throughout the state, introduce members to state-level policymakers,

National Level

An uncomplicated way to be involved in advocacy work at the national level is to use SurgeonsVoice.⁹ This website is a central repository of current political issues that are impactful to the surgical community. Any member of the ACS can access this advocacy site that features prepared letters surgeons can use to contact their members of Congress. The process simplifies surgeon support of bills that benefit the profession and our patients.⁹

ACS Leadership & Advocacy Summit

Another way to be involved in advocacy is the ACS Leadership & Advocacy Summit hosted each year in Washington, DC. This two-part conference begins with a robust leadership program, then transitions to an advocacy meeting that includes discussions with experienced lobbyists, visits from lawmakers and legislative champions of ACS priorities, training sessions on how to be an effective advocate, and more. The summit concludes with a day of meetings on Capitol Hill with members of Congress.

This conference is a singular opportunity for networking, including the SurgeonsPAC reception,



Early career surgeons are critical for advocating for legislation that impacts the future of surgical training and access to care.

hands-on advocacy training, and the chance to learn from informed and inspiring speakers.

Trainees and young surgeons are vital to surgical advocacy because they have a unique understanding of surgical patients and the issues that impact their surgical care. We encourage all RAS members to learn more about the many ways that the ACS and RAS support the development of surgeon-advocates. As a young surgeon, you have an important perspective that helps address even the most complex problems facing surgery today and the surgeons of tomorrow. **B**

Dr. Rachael Essig is a fifth-year general surgery resident at MedStar Health–Washington Hospital Center in Washington, DC. She also is Vice-Chair of the RAS Advocacy and Issues Committee.

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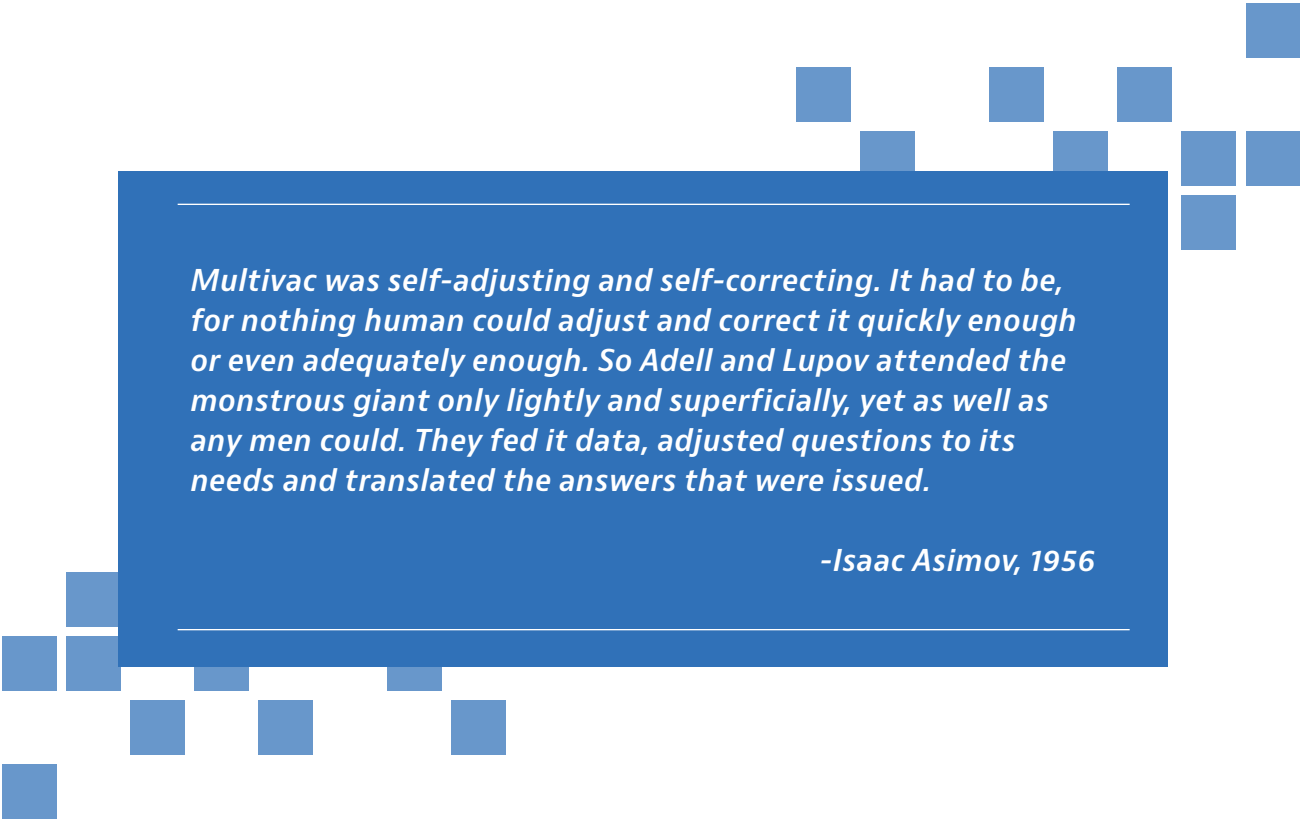
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How Artificial Intelligence Is Expected to Transform Surgical Training

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Multivac was self-adjusting and self-correcting. It had to be, for nothing human could adjust and correct it quickly enough or even adequately enough. So Adell and Lupov attended the monstrous giant only lightly and superficially, yet as well as any men could. They fed it data, adjusted questions to its needs and translated the answers that were issued.

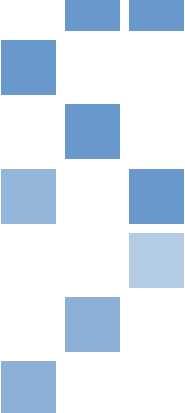
-Isaac Asimov, 1956

An idea previously reserved for science fiction, artificial intelligence (AI) has become ubiquitous within our world of modern technology, with tools such as ChatGPT, Google Lens, Microsoft PowerPoint Speaker Coach, and others entering the mainstream at an increasing rate.

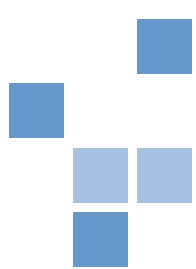
AI LOOSELY IS DEFINED AS A FIELD of computer science that uses theories and algorithms to give computer systems the ability to perform tasks such as problem-solving, language processing, and decision-making.¹ These computer systems have finally accrued a critical mass with regard to large data and knowledge such that use of AI can be seen across industries and is transforming every field, including medicine, surgery, and medical education.

Over the past 20 years, a substantial transformation in surgical training has occurred. Graduate medical education has shifted away from the traditional apprenticeship model of teaching to a more focused, competency-based training in the 21st century. The breadth of material to learn has expanded over time.

An evolution in operative techniques—from open to minimally invasive and endovascular or image-guided approaches—has had an impact on resident



Over the last 20 years, a substantial transformation in surgical training has occurred.



education, requiring extensive and prolonged training to gain proficiency. The American Board of Surgery (ABS) and the ACS have attempted to address these issues with the introduction of Entrustable Professional Activities (EPAs) and the Mastery in General Surgery Program, respectively.

This shift in surgical education workflow and productivity has not occurred in isolation but rather within a greater movement in information technology. AI now has the ability to impact healthcare and surgical training. This article explores how surgical trainees can interact with AI through surgical education, skills acquisition, and intraoperative decision-making, and it also examines ethical considerations surrounding AI.

AI in Surgical Education

Despite the relatively recent introduction and popularization of AI, there have already been multiple applications of this tool to benefit, advance, and facilitate surgical education.

One of the previously mentioned AI tools is ChatGPT, a large language model developed by OpenAI, trained using a large amount of textual data available on the Internet. ChatGPT was launched on November 30, 2022; by January 2023, it had already reached a total of 100 million users, making it the fastest-growing application.² This tool is able to produce text that emulates human language and can be applied in a variety of processing tasks.³

AI has been used to assist in surgical education, both from the learner's and teacher's perspectives.^{2,4}

The Learner Perspective

The rapid advancement of the medical field brings along an overwhelming amount of new information that needs to be triaged, skimmed, and then read and internalized continuously.

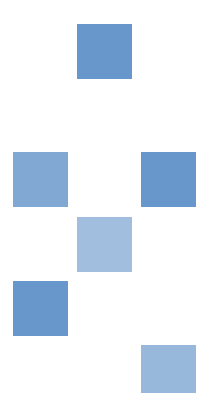
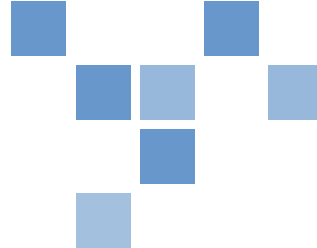
Data from 2016 showed that within the biomedical sciences, more than 1 million papers were being added to the PubMed database every year, corresponding to approximately two papers per minute.⁵

AI allows students to quickly triage the most relevant articles within an area of interest and even summarize their content for a quick read so they can stay up to date on new information and research.

Preparing for a big test or developing a study routine largely relies on creating good study habits and having access to study materials that are adequate to an individual's best modality of learning.

ChatGPT and AI in general can assist the trainee in organizing a study routine by forming a study plan, as well as pointing out and generating personalized study materials, including flashcards, quizzes, and practice scenarios/questions. This process also could include generating material to prepare for a surgical case (e.g., operative steps, indications, complications, postoperative evaluation). These approaches to learning can be completed in a quick and efficient way using this technology.

Another way AI can be used by the learner is to have it generate case scenarios in the areas of interest by simulating patient encounters. This strategy allows the student to practice



clinical decision-making, from clinical diagnosis to treatment. The student also can practice answering medical questions while preparing for a test or the beginning of a residency program.

AI can be used to practice how to communicate medical concepts to a patient in a clear and objective way, using adequate terms tailored to a patient's level of health literacy. This approach also can be helpful to practice tough conversations, including those about end-of-life goals of care.

AI can help with searching literature and generating bibliographies for a research project. This includes translating material from other languages, which allows a broader range of articles to be screened and included in a project.

The Educator Perspective

Every student learns best in his or her own unique way. Using AI, the educator can recreate the same study content using different materials or methods to satisfy the needs of different styles of learning. This approach includes creating a variety of different exercises, quizzes, and clinical scenarios.

Trainees can leverage AI to prepare for exams, participate in journal clubs, or produce high-yield lectures and materials for their teams.

Algorithms already exist to screen residency applications using set parameters (e.g., standardized test scores, number of publications). However, AI can enhance the application process by using themes within personal statements, recommendation letters, and work-life experience to find a program's ideal

candidate that may otherwise be overlooked.

AI, which is not limited to passive forms of scoring, may eventually be capable of interacting with trainees who are taking examinations such as the ABS Certifying Exam and scoring them in real time.

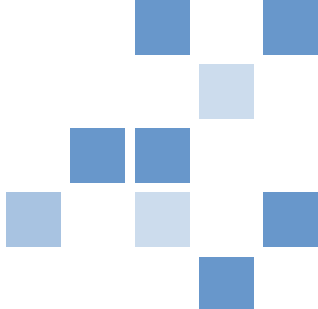
In addition to being able to filter and sort large quantities of data, AI also has the ability to evaluate what is missing from a dataset. This functionality will allow educators to critically review and assess feedback and surgical resident performance results and evaluate areas of deficiency. With these AI-enabled assessments, instructors will be able to modify their teaching strategies in areas where students struggled.

Skill Acquisition and Surgical Simulation

Advances in surgical innovation have far outpaced advances in surgical training and competency. In 2017, George and colleagues suggested that as much as 20% of graduating residents did not meet competency in core surgical procedures.⁶ Restricted work hours and the increase in nonclinical administrative responsibilities have contributed to decreased operative experience during residency.⁷

This dilemma has led to an unprecedented opportunity for surgery programs to explore cutting-edge technologies and pursue innovative approaches for training surgical residents while reinforcing skill acquisition.⁸

Virtual-reality (VR)-based training modalities may offer a solution to the challenges posed by decreased operative experience during residency. VR platforms



provide a closely simulated hands-on operative environment while addressing training gaps through checklists.

While simulators offer trainees the opportunity to hone their surgical skills, they do not inherently provide feedback the way an experienced surgical attending might.

However, machine learning may help bridge this gap. Machine learning, a subfield of AI, involves generating algorithms and models capable of novel prediction by using historical data as examples with the focus of improving accuracy.⁹

By combining VR simulation with machine learning, trainees would benefit from a fully immersive experience while receiving unbiased personalized feedback to more efficiently facilitate their skill acquisition. Much like flight simulators in the aviation industry, the demand for VR simulation, skill acquisition, and ultimately certified proficiency prior to operating likely will grow.

Intraoperative Guidance and Assessment

For surgical trainees, accuracy and reliable assessment of performance are critical for developing into a competent and safe surgeon.

Given the inherent risks, surgery often has been compared to other disciplines with similar levels of risk, such as aviation or motor racing, and yet a surgical trainee's assessment is much less

sophisticated. Broadly based on the apprenticeship model of Halsted, assessment is largely delivered by a surgeon mentor.

While objective means of performance assessment exist, such as the Objective Structured Assessment of Technical Skills and most recently the ABS launch of EPAs in July 2023, these tools are time-consuming and limited by rater bias.¹⁰

To that end, AI has the promise of rapid, automated, reproducible surgical performance assessment that is objective and would allow for continuous feedback without necessarily the need for direct observation by an expert surgeon.

New technological innovations such as robotic surgery platforms offer a wealth of digital information like kinematics, sensors, and video data that can be used to provide automated objective skill assessment and prompt constructive feedback to surgeons and trainees.

Robotic platforms are capable of mapping the kinematics and video data of its arms and tools and convert these movements into measurable metrics (e.g., speed and number of hand movements, path length, force, torque, time to complete operation). These metrics previously have been used to differentiate expert surgeon from novice post hoc, but only recently have machine learning techniques been able to automatically differentiate the skill level of the robotic operator within seconds.¹¹

By combining VR simulation with machine learning, trainees would benefit from a fully immersive experience while receiving unbiased personalized feedback to more efficiently facilitate their skill acquisition.

AI also can be used to analyze surgical videos with the goal of providing decision-making support and improving surgical quality and patient outcomes. A group out of Stanford University in California developed a neural network model that analyzed over a thousand videos of the critical view of safety to investigate the reliability and utility of AI-driven procedure segmentation and annotation.¹²

The model identified whether the critical view of safety was achieved with remarkable efficiency (50 videos in 1 hour). However, the AI model was unable to discern nuances associated with disease severity; for instance, how much of the cystic duct needs to be visualized in a “difficult” gallbladder remains a limiting factor.

Ethical Limitations

While the integration of AI technology into surgical training heralds a transformative era in the House of Surgery, the promise of better surgery and patient outcomes must be balanced with caution and consideration of their use.

The output of machine learning and other AI models is only as good as the accuracy of the data used to develop them. A recent study found AI systems do not account for malignant stereotypes, such as racial and sexual biases, and its facial-recognition model was unable to accurately identify women and people of color and ultimately unable to incorporate this information into its algorithm.¹³ Racial background and socioeconomic status are well-recognized contributors to disparities in surgical outcomes.^{14,15} Developing algorithms and technologies that do not critically assess existing biases in datasets may lead to the perpetuation of these disparities.

AI in medicine requires massive amounts of patient data in order to develop reliable and accurate algorithms. With a growing number of cyber attacks, there remains an appropriate concern regarding the storage, management, and protection of patient health records.

Information security is critically important in protecting the patient and their information, and health systems must mitigate these risks by investing in expertise and data infrastructure.

As fascinating as many of these technologies promise to be, few studies demonstrate improvement

in care when AI-assisted decision-making is used.¹⁶

Barriers to clinical impact remain, including interpreting results arrived by AI. Known as the “black box” design, researchers often are left with little ability to assess or understand why the system arrived at a particular decision or solution.

In other words, AI is unable to yet determine causal relationships in data in ways necessary for clinical implementation nor is it able to provide interpretation of its own analyses.¹ In effect, predictions generated by AI must continue to be critically assessed by humans, who will then interpret the data in clinically relevant ways.

Ultimately, as it stands, AI does not have promise to replace the clinician, particularly regarding the skills associated with bedside acumen and decision-making, and this reality should continue to be reflected in surgical training models.




Looking Ahead

AI has the ability to greatly shape the field of surgery going forward and this can perhaps best be summarized by AI itself.

User Prompt>>

Write a conclusion for our editorial for the American College of Surgeons on how AI will improve surgical training.

ChatGPT>>*

“The era of AI-driven surgical training holds immense potential to revolutionize the way surgeons are educated and trained. By harnessing the power of AI, the American College of Surgeons can empower future generations of surgeons with enhanced technical skills, deeper anatomical knowledge, and data-driven approaches to patient care. Through responsible integration and continued collaboration between humans and machines, we can achieve safer surgeries, improved patient outcomes, and a brighter future for surgical practice.” 

*Text generated by OpenAI's AI Assistant: <https://openai.com>.

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General Surgery Residency Training Continues to Evolve

Jana M. Sacco, MD
Christina Colosimo, DO
Christine Chung, MD
Joana E. Ochoa, MD



Surgical residency has evolved significantly over the course of the last several decades.

WE HAVE ALL HEARD OUR SURGICAL MENTORS recount their time as residents. They were confined to the hospital for days at a time; sleep was a privilege; they did not see their friends and family for long periods of time. It was a badge of honor.

Thankfully, times are changing. After the landmark report from the Institute of Medicine (now the National Academy of Medicine), “To Err Is Human: Building a Safer Health System,” which investigated medical errors that occurred in the US medical system, detailed the challenging, long work hours in residency training, the concept of duty hours was born.¹

Since that time, there has been a substantial amount of research evaluating duty hours—most recently with the Flexibility in Duty Hour Requirements for Surgical Trainees (FIRST) Trial that demonstrated noninferior outcomes when comparing flexible, less-restrictive duty hours to the standard duty hour requirements.

The FIRST Trial, as well as many other studies, showed weaknesses in training in regard to resident

well-being, with 39% of residents reporting weekly burnout symptoms.² In response to this growing body of research, in 2017, the Accreditation Council for Graduate Medical Education revised its Common Program Requirements requiring all residency programs to address physician wellness and resiliency.

Similarly, there have been significant evolutions to the manner in which competency is evaluated, dramatically changing residency training. The paradigm of “see one, do one, teach one” is no longer the standard. Instead, there has been a shift to a competency-based training model to assess a resident’s ability to perform procedures versus the sheer number of operations they have performed, as volume alone is not an indication of technical skill.

The American Board of Surgery introduced an Entrustable Professional Activities project to assist in the assessment of residents as the shift to competency-based training is fortified. Even with these changes in the educational priorities and evaluation metric of surgical residencies, there

remains significant concern regarding the effects of these changes on physician readiness for practice.³

While uncertainties remain in surgical training, this transcends level of training and persists with early career surgeons who are navigating many changes as they transition to attendings.

As part of the Associate Fellow Committee of the Resident and Associate Society (RAS), our goal is to address the issues often faced by early career surgeons and support everyone in this exciting but, sometimes, turbulent endeavor.

Balancing Institutional and Education Goals

A study from de Montbrun describes the four stages of becoming an attending. The initial phase is called “getting undressed” where attendings can no longer identify with the residents and fellows, but still do not belong to the attending group.⁴

While uncertainties remain in surgical training, this transcends level of training and persists with early career surgeons who are navigating many changes as they transition to attendings. The transition from residency to becoming a new attending challenges physicians with a multitude of new tasks. New educational responsibilities include working with residents, medical students, and advanced practice providers (APPs) but no longer interacting as just a trainee. The onerous task of being responsible for all decision-making, which now includes the actions of residents and APPs, is a particularly difficult function to come to terms with and can take several years (some may say never) to fully master.

Committing to research projects and maintaining productivity outside of the clinical realm is increasingly used as a measure of success, especially in academic systems. Additionally, there are new responsibilities for these individuals, including



practice management, which could entail billing and coding, running a clinic, managing hospital staff expectations, and learning a new system.⁵

The process of transitioning to practice may include balancing some or all these tasks. Depending on the residents' training, it may be the first time in their careers as surgeons that they are responsible for these tasks.

One way to set residents up for success is to incorporate a transition to practice curriculum early in residency education.^{6,7} To address feelings of inadequacy in regard to independence, some programs have instituted specific rotations to enhance autonomy and challenge residents to think as if they were in practice on their own.⁵

There are some barriers in this type of programming as educating residents as a new faculty can cause conflicting interests. Productivity measures are monitored for promotion and career advancement, but educating learners can impact productivity. Unfortunately, the increased level of involvement by senior residents in patient care often can be misconstrued by the public as a lack of attending involvement or subpar care.⁸

In a survey of 2,000 respondents, one-third of patients would only allow a PGY-5 to be involved in their care, one-third believed they were more likely to have a complication if a resident was involved, and one-third would not allow a resident to perform the procedure independently without the attending in the room no matter the resident's experience with the operation. In addition, 80% indicated they should be able to decline resident participation in the surgery.⁸

Changing public perceptions and spending dedicated time talking to patients regarding residents will enhance surgical training and patient satisfaction.

In addition, many institutions have resident expectations for rotations, but not always for attendings. Senior partners and mentors are helpful in setting goals for new attendings. Continued encouragement and open dialogue are essential and should be integrated in the first year of practice. Understanding the institutional expectations for junior faculty at one's own residency program also can help develop educational responsibilities and goals.⁶

Many surgical societies offer formal mentorship programs for early career surgeons.

Similarly, some institutions have developed onboarding programs that include mentoring and leadership development along with training on nonclinical skills such as billing and coding.⁶ Self-assessment guided by strong mentors allows for challenges to be addressed as they occur versus dissecting how one could have done better retrospectively.

In some cases, early career surgeons who may be doubting themselves in their new roles may have internal and external conflicts when paired with a confident, perhaps, overzealous chief resident. While some surgeons would not be challenged by this level of pairing, others may prefer to work with more junior residents as they become more comfortable in their new role. Changes in rotation structures for the educational benefit of both the early career surgeon and residents can be addressed as necessary with scheduled check-ins between junior and senior attendings.

Many academic centers have criteria listed for promotion and the time it will take on average to reach these goals. Guidelines for community-based and private practice surgeons tend to be less clear on how to advance in those settings.

These criteria often are not completely stated upfront or difficult to understand, which can delay advancement for early career surgeons. There is typically no education or discussion regarding these topics in residency so many surgeons may be ill-equipped to ask the right questions. It is essential that departments and institutions share specifics

Changing public perceptions and spending dedicated time talking to patients regarding residents will enhance surgical training and patient satisfaction.

One in four physicians experiences imposter syndrome, and the rate of imposter syndrome is likely higher for young surgeons.

regarding goals for advancement and educational expectations along with any recurring updates as necessary based on their professional level.

Regular proactive mentoring with evaluation of productivity can ensure that professional goals are being met or on track.

Addressing Feelings of Inadequacy

Imposter syndrome is defined as the persistent inability to believe that one's success is deserved or has been legitimately achieved as a result of one's own efforts or skills.⁹ One in four physicians experiences imposter syndrome, and the rate of imposter syndrome is likely higher for young surgeons.¹⁰

As we begin our careers as surgeon educators, these are feelings we often have, but are they warranted? Residency taught us to operate and take care of patients, so even though we may feel inadequate in our clinical skills at times, we truly are qualified.

How to teach, on the other hand, is not formally integrated into residency curriculum and, in essence, many of us learn to do this by trial and error. Despite the lack of formal education in this area, we are expected and required to teach.

To address this conundrum, many programs have attempted to integrate teaching curricula into residencies with variable results depending on the method employed.¹¹

The ACS has an annual 2-day Residents as Teachers and Leaders course that helps address these essential nonclinical skills. Due to space limitations, resident funding, and time constraints, though, not all trainees are able to take advantage of this type of focused programming.¹²

With the uncertainty of our own paths, it may feel difficult to teach and mentor others. To address these feelings and help manage any doubts, early career surgeons should be encouraged by their partners and departments to set expectations and goals in regard to teaching and rotation expectations.

In some cases, surgeons may choose to operate with

an intern, particularly if the surgeon is not ready to yield control. Alternatively, for complex cases, it may be beneficial to have the more experienced hands of a chief resident as an assistant, which will enhance trust as their skill and judgment can be assessed.

The most important factor in being a successful teacher as a new surgeon is setting clear expectations with trainees. Although an early career surgeon may not be able to give the same level of autonomy to residents as our partners who have been practicing for 20 years, there are other ways to enhance their clinical and nonclinical training. If we are doing a certain portion of the case, explain what we are doing, and more importantly, why. This is an example of show and tell, which is an important step in surgical education.

Another way to provide education as a young surgeon is to offer information on how to successfully transition to an attending. Some small steps could include talking to the family as a team, so the resident has the opportunity to watch how you manage this interaction. Eventually, this can progress to the resident talking to the family with the attending observing. In fact, this could be a step in establishing entrustable professional activities for residents.

Another important lesson is building relationships with other services and providers, which will translate to relationships which are needed to develop one's own practice.

Additional Resources for Postresidency Education

Currently, there are several programs that can assist surgeons as they move on to their first jobs following residency or fellowship. The ACS holds multiple online coding courses that are available on demand or in person. In addition, the College has produced resources to aid in practice management as trainees may not have been exposed to these responsibilities in residency.

Just as a focus on well-being and mental health has now been integrated within general surgery programs, incorporating billing and coding can be

the next step in preparing residents for their first jobs out of training. This can be included in SCORE curriculum or Grand Rounds programming. The ACS also has developed the Mastery in General Surgery Program for residents who decide to take an additional year to focus on fine-tuning their skills and obtain a broad understanding of practice management.

While the ACS also provides information regarding finances through conference programming and webinars, there is no formal programming or incorporation of financial literacy into residency training. Emphasis on educating oneself regarding finances during and after residency should be addressed early on in training. Finance-related tasks are not something many surgeons have the time or ability to comprehend, and there is no shame in seeking the counsel of financial advisors who specialize in working with physicians.

The ACS also has a wide source of Continuing Medical Education credits through conferences and educational tools such as the Surgical Education and Self-Assessment Program that practicing surgeons can use to remain up to date on general surgery topics.

Our Call to Action

We need to continue evolving our training programs to not only produce the most technically skilled residents but also surgeons who are prepared for their transition into practice. Surgical residency is difficult and already saturated with the essentials on how to be a safe and competent surgeon. However, this should not deter us from constantly striving to improve.

As we continue providing excellent training to residents and surgical care to our patients, our goals should be to support trainees and early career surgeons and provide materials that enhance their ability to practice surgery and reduce the burden and anxiety of practice management. Incorporating curriculum for the “practice of surgery” early on in our training can aid in this endeavor. **B**

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Dr. Carter White

Next Generation of Clinicians Lead Charge Toward Healthcare Sustainability—But They Need Help

Carter White, MD

EXCEPTIONAL SURGICAL care has become the expected standard in the US, and the clinical research that drives this care has a significant impact at the international level.

But as a future orthopaedic surgeon, I find it impossible to ignore the inordinate amount of surgical waste and energy use related to the work we do without questioning how our actions affect the health of those we intend to heal.

The healthcare sector is responsible for 8.5% of all US greenhouse gas emissions.¹ According to an article published in the December 2020 issue of *Health Affairs*, "...health damages stemming from US healthcare pollution [are] on the same order of magnitude as deaths from preventable medical errors."²

Operating rooms (ORs) are particularly culpable because they generate approximately 20% to 30% of hospital waste and two-thirds of hospitals' regulated medical waste while consuming three to six times more energy than anywhere else in the hospital.³ An increase in disposable and single-use products has exacerbated waste in the OR despite having no proven advantage in cost, sterility, or patient outcomes.^{4,5}

Anesthesia-related waste alone represents 25% of all OR waste, despite approximately 60% of

this waste being recyclable.⁶ Anesthetic gas emissions have significant negative environmental impact. Analysis of the life-cycle emissions of inhaled anesthetics demonstrates considerable, and often uncalculated, greenhouse gas emissions.⁷

For example, using the anesthetic gas desflurane for 1 hour is equivalent to driving a gasoline-powered car approximately 198 miles.^{8,9} Nitrous oxide, another common anesthetic gas, is a main

contributor of greenhouse gas emissions and accounts for roughly half of total emissions from inhaled anesthetics.¹⁰ And even worse, due to leaking central pipeline systems, significant amounts of nitrous oxide are lost through infrastructure leaks before clinical use; some reports note that 95% of purchased nitrous oxide is wasted.¹¹

Surgical professionals are in the unique position to dramatically

reduce the environmental impact of surgical services without compromising quality or patient safety. Aligning with healthcare's mission to do no harm, it is imperative that we begin making decisions and implementing policies to dramatically improve the sustainability of healthcare. It is contradictory to healthcare's healing mission to generate mountains of waste and pollution that create and exacerbate health problems.

Fortunately, there is already a widespread understanding

among surgeons of the significance of waste produced by ORs and a growing willingness to change surgical workflow to help reduce waste.^{12,13}

Surgeon leaders should support the development of creative solutions to address common sources of healthcare waste. For example, construction of new clinical buildings should consider the elimination of nitrous oxide piping in favor

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An increase in disposable and single-use products has exacerbated waste in the OR despite having no proven advantage in cost, sterility, or patient outcomes.



of using individual, portable canisters when clinically indicated.

We also should incentivize research into known and unknown data gaps within the evolving field of healthcare sustainability. Federal funding should prioritize research that supports systematic evaluation of the climate impact of various surgeries, and of medical devices and supplies throughout their entire life cycles.

Additional emphasis should be placed on research that assesses the impact of carbon on public health. Academic journals and medical societies should recognize the significance of healthcare sustainability and actively dedicate journal sections and conference sessions to discussing related topics.

Similarly, medical schools should recognize the clinical and scientific merit of published work in this field and consider such research worthy of academic advancement. Notably, institutions who publicly recognize the importance of healthcare sustainability should simultaneously encourage academic clinicians to incorporate this work into their career tracks.

A cohesive effort between funding sources, medical journals and societies, and research institutions would foster an environment poised to produce

the substantial changes the healthcare sector requires. Such a collaborative effort could drive the study of the economics of healthcare sustainability, lead to more sustainable practices, and facilitate partnerships with private industry to enhance the multidisciplinary development of sustainable alternatives.

As a trainee with decades remaining in my career, I recognize the potential to recruit young clinicians motivated to address the challenges of providing state-of-the-art medical care while mitigating the damaging effects of this care on the environment.

However, if we do not develop the supportive infrastructure to create opportunities to pursue sustainability initiatives, we will lose the potential for another generation of researchers, clinicians, and educators to confront this urgent, man-made crisis.

I hope that we—as healthcare leaders—continue to understand the significance of this challenge and dramatically improve the way we deliver patient care, with particular emphasis on the following priorities:

- Critically analyze our current healthcare system for opportunities to eliminate waste by considering creative alternatives



- Incentivize research through increased funding and dedicated journal sections and conferences
- Encourage and promote academic faculty to integrate healthcare sustainability into their career tracks
- Form novel partnerships within academics and with private industry to develop sustainable, reusable products and practices

Through a consolidated effort, we can transform the healthcare sector so that future clinicians can improve the health of others while reducing the environmental impact of surgical services. **B**

Disclaimer

The thoughts and opinions expressed in this viewpoint article are solely those of Dr. White and do not necessarily reflect those of the ACS.

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Dr. Anthony Duncan

Cancer Teaches Unexpected Lessons in Self-Care

Anthony J. Duncan, MD

AS I SIT at a coffee shop trying to study for an upcoming in-service examination, my phone rings. I see that the caller ID is from the hospital, and I know what is coming. I take a deep breath and answer, only to hear the standard greeting for delivering bad news.

“Hello, Anthony, is this an okay time to talk?”

My heart sinks, and I wonder if there will ever be a good time to hear bad news. I respond affirmatively, and my primary care provider delivers the news I had been dreading: the radiologist is very concerned that you have cancer.

A few days earlier, I had noticed a painless testicular mass and immediately scheduled an appointment with my primary care provider. The subsequent ultrasound, which included a trainee performing the exam under the supervision of a trainer, went smoothly.

The trainer repeated the ultrasound after the trainee was complete. She then met with the radiologist to see if additional images were needed before I left. I knew this was not the standard routine. As I left the hospital, I had a sinking feeling that things were not normal, and that the

results would not be benign.

The next few days were a blur. I oscillated between feeling nothing then having a rush of thoughts flood in. I reflected on the patients to whom I’ve delivered bad news during my short career so far, and I thought about the countless hours I had spent studying, researching, and working. At the time, I was training as a third-year general surgery resident at the University of North Dakota in Fargo.

I thought about the personal sacrifices I had made, including missing out on time with friends and family. Missing

weddings, births, and moving across the country away from everyone I knew—all for the sake of becoming a physician who can make a difference in patients' lives.

I had postponed so many things, telling myself that I would have time down the road. But now, I wondered if all those sacrifices were for nothing. Was my goal of making an impact in patients' lives now unattainable?

Even though I had suspected this outcome from the beginning, tears still welled up in my eyes. My primary care provider assured me that this type of cancer is curable in 94% of cases and outlined the next steps, including further testing and referrals to specialists. Of course, I only heard that 6% are not cured. She then suggested a consultation with reproductive medicine to discuss fertility considerations. I got off the phone, slowly packed up my stuff, and headed home.

The next day, I reached out to the leadership of my program at the University of North Dakota to inform them of this news. At this point, I was trying to figure out how to work as much as possible through the surgery I would need and the subsequent chemotherapy.

During the conversation, I found them remarkably receptive and kind. They told me to take off as much time as I needed and not worry about

patients or the service I was on. This was the polar opposite of what I expected from a surgical residency leadership.

As I returned home, I started to reflect on many things, but predominantly on the concept of wellness that recently has become a focus of so many physician talks and articles.

During my time in medical school and residency, I attended many lectures and workshops on wellness and self-care, but I had never taken the time to apply any of the recommendations or strategies to myself.

I realized that much of what I had learned during my training, and what I often tell patients to practice, I was not applying to myself. This was a wake-up call.

While my diagnosis was not terminal, I appreciate that it could have been, and I have seen many people my same age who have had their lives cut too short.

While we all strive to be the best physicians in order to take care of people, it is truly important that we also take care of ourselves. Evident by my experience with surgical residency leadership, the surgical culture clearly is shifting from the classic mindset of residency takes precedence over all else. It is important that, with these changes, we fully instill this perspective within ourselves and take the time not only for self-care, but also to fully enjoy our families and friends. **B**



Disclaimer

The thoughts and opinions expressed in this viewpoint article are solely those of Dr. Duncan and do not necessarily reflect those of the ACS.

Dr. Anthony Duncan is a general surgery resident at the University of North Dakota with plans to specialize in burn surgery and critical care. He also has a passion for medical education research and quality improvement.

Light Source-Related Burns Are a Real Problem

Lenworth M. Jacobs, MD, MPH, FACS

IN APRIL 2020, A RESEARCHER FROM the UK examined a case study involving a 23-year-old patient who experienced a light source-related burn after undergoing a routine arthroscopic surgery.*

Arthroscopy—as well as laparoscopy and thoracoscopy—requires an illumination system to provide the surgeon with better visualization of the body cavity or bone joint. To accomplish this, surgical teams use light sources featuring fiber-optic or gel-filled cables.

In this case, the patient underwent surgery for a lateral meniscus tear. The team was made up of an experienced surgeon and scrub nurse, and the surgery was noted to be “uneventful.” However, after the team removed the surgical drapes, they found a “circular and white lesion with an inflamed periphery measuring about 1 [centimeter] in diameter” on the patient’s thigh. The team also found a pinhole-sized perforation in the surgical drape where the patient’s thigh was located during the procedure.

While there was no evidence of

smoke or burning, the team noted the light source had been on for approximately 50 minutes. The patient was referred to a plastic surgeon who diagnosed the patient with a full-thickness burn. According to the patient, the burn was painful, and it took several months to heal.

Later, the surgeon tested the light source on himself to investigate the issue. Within 20 minutes of the light source being on at its maximum brightness and pressed to his skin, he said it was too hot to continue, and it left a “small white mark.” The surgeon also tested the light source on a surgical drape, and he noted that “it produced a small burnt perforation in the paper without visible smoke.”

The surgeon reported that within hours, blisters appeared on his skin where he had tested the light source and even “at points that were not initially blemished following contact with the cable adaptor or the arthroscope end.” The lesions were inflamed for several weeks, and the scars remained for nearly 6 months.

“Self-experimentation suggests

the burn likely developed at the end of the procedure, by inadvertent approximation of the cable to the drape overlying the patient’s thigh,” the study author wrote. “The diameter of the burn suggested it could not have arisen from the tip of an illuminated arthroscope.”

The study also noted that “the most troubling aspect of this case is that the patient was burnt without the surgical team being aware.”

Light source-related burns are a real problem that can affect all practitioners, from residents in training to board-certified surgeons. Since 2019, more than half of the fires/burns-related sentinel events that have been reported to The Joint Commission were associated with surgical or invasive procedures—and nearly 15% of those periprocedural incidents were related to light sources.

Everyone should be taking the appropriate precautions so that these situations become “never events.”

To assist healthcare organizations, The Joint


*Chitnavis J. Silent burn: The hidden danger and effects of bright light from fibre-optic cables in arthroscopic knee surgery. *J Surg Case Rep*. 2020;(4):rjaa068. Available at: <https://academic.oup.com/jscr/article/2020/4/rjaa068/5816682?login=false>. Accessed June 14, 2023.

Everyone should be taking the appropriate precautions, so that these situations become “never events.”

Commission issued a *Quick Safety* newsletter addressing this topic. Several safety actions were suggested to help prevent burns related to the use of light source scopes, including:

- Educate all surgeons, including physicians in training, who perform laparoscopic, thoracoscopic, or arthroscopic procedures on the importance of handling the scope safely.
- Implement system changes to minimize the risk of patient burns associated with laparoscopy, thoracoscopy, and arthroscopy.
- Label light sources with the following: “Warning: High-intensity light sources and cables can ignite drapes and other materials. Complete all cable connections before activating the light source.”
- Do not turn on the light source before the cable is connected to the scope; the end of the cable becomes hot and could ignite dry combustibles.
- If the cable is disconnected from the scope during surgery, hold the cable end away from the drapes or place it on a moist towel.

- Keep illuminated light cords away from drapes, the patient’s skin, personnel’s skin, and any flammable material.
- Connect the correct-size light source to the correct scope.
- Inspect all instruments and equipment before use to ensure the equipment is in good working order.

The *Quick Safety* also has information on how the light source can cause a burn and when high temperatures may be produced. The issue may be read for free at: jointcommission.org/resources/news-and-multimedia/newsletters/newsletters/quick-safety/quick-safety-issue-69. 

Disclaimer

The thoughts and opinions expressed in this column are solely those of Dr. Jacobs and do not necessarily reflect those of The Joint Commission or the American College of Surgeons.

Dr. Lenworth Jacobs is a professor of surgery and professor of traumatology and emergency medicine at the University of Connecticut in Farmington and director of the Trauma Institute at Hartford Hospital, CT. He is Medical Director of the ACS STOP THE BLEED® program.



Quality and Safety Conference Charts the North Star of Surgical Quality

Matthew Fox, MSHC

L'ÉTOILE DU NORD, French for “the star of north,” is Minnesota’s state motto and “emblematic of what you all do every single day as we try to achieve quality—we head toward that North Star,” said Clifford Y. Ko, MD, MS, MSHS, FACS, FASCRS, Director of the ACS Division of Research and Optimal Patient Care, in his welcome to the 2023 ACS Quality and Safety Conference.

More than 1,100 surgeons, nurses, registrars, surgical quality officers, and other members of the healthcare team attended the conference, which took place July 10–13 in Minneapolis, Minnesota. In addition to key general sessions, several of which will be summarized in this article, the conference featured

dozens of breakout sessions, poster abstracts, the popular Quality Improvement (QI) Basics Preconference Workshops, and social events.

Laying out the conference foci and themes, Dr. Ko acknowledged that some attendees were there as representatives of the patient care space; others were in the evaluation, registry, and data management space; and others enact the surgical quality and patient safety initiatives that will lead to improvement. Some play a part in all three areas.

“What we get to see at the College is the orchestra—all the pieces playing together,” Dr. Ko said.

The Quality and Safety Conference provides an

opportunity for various disciplines to share their initiatives, findings, and best practices, while coming together with the College to learn how the organization is providing more comprehensive resources than ever to improve patient care.

As examples, Dr. Ko discussed how the ACS Metabolic and Bariatric Surgery Quality Improvement Program, Trauma Verification Program, and National Accreditation Program for Breast Centers have each had a tangible impact on improving outcomes and decreasing complications through useable data capture. The ACS is expanding its reach to help ensure that all hospitals have the tools to improve their quality.



“Quality is more critical than ever before,” Dr. Ko said. “The ACS believes that quality improvement is such a high priority that we’re embarking on a new national QI effort—The Power of Quality campaign. Ultimately, quality can only be achieved by working together.”

The campaign is aimed at elevating care for all patients undergoing surgery by raising awareness of quality paradigms and engaging hospitals, payers, and policymakers to advocate for initiatives that work.

Moving Beyond Admiring Problems, and Other Leadership Lessons

Achieving effective surgical QI requires strong leadership, which the COVID-19 pandemic and other increasing stressors in healthcare have revealed in recent years. But the concept of surgeon leadership is evolving, according to three leaders who spoke in a panel discussion.

Despite their *prima facie* similarities, there are key differences between managers and leaders, according to Amalia

Stefanou, MD, FACS, a colorectal surgeon at the Moffitt Cancer Center in Tampa, Florida.

Dr. Stefanou said that “manager” is a job title that focuses on structure, processes, and eliminating risk, while “leaders focus on people—inspiring, motivating, and aligning members of the team to innovate and develop in service of a mission.”

There is overlap between a manager and leader, including a need to collaborate with their team members to see success, solicit and offer useful feedback, and seek and recognize progress when possible and appropriate. But for most leaders, “management is just a first step toward leadership,” Dr. Stefanou said.

Regardless of titles, leaders in the surgical QI space should seek to be “working foremen”—the experts “who really know their stuff” when it comes to gathering and using data, according to Bruce L. Hall, MD, PhD, MBA, FACS, system chief medical officer for BJC HealthCare in St. Louis, Missouri, and Director

of the ACS National Surgical Quality Improvement Program® (NSQIP®).

NSQIP, as well as the other ACS databases and registries, offer hospitals a plethora of information, and an important characteristic of a surgical QI leader is to be able to “understand how the data available to you match your system’s mission and priorities,” Dr. Hall said. Make sure you understand what the information is telling you about the procedure, process, or service you are looking to improve, and use that information to help assuage fears or hesitation that your team might be feeling when it comes time to change your workflow.

Perhaps most importantly for surgeon QI leaders, all of whom will be well versed in the challenges facing their hospital or health system, is to act—to move beyond simply “admiring” a problem and instead, work to resolve it, according to Patricia L. Turner, MD, MBA, FACS, ACS Executive Director & CEO.

“Action is key to leading,” Dr. Turner said. “And admiration is an impediment to action. We can admire a problem to death, but that alone won’t lead to addressing it.”

Effective surgical QI requires active leaders who can craft a strategy to reach a desired endpoint, inspire a team’s actions to change and transition, and acknowledge that they need to define a problem before they can start creating solutions.

Regardless of titles, leaders in the surgical QI space should seek to be “working foremen”—the experts “who really know their stuff” when it comes to gathering and using data.

Bruce L. Hall, MD, PhD, MBA, FACS



Leaders who stay in the admiring stage too long will hinder any improvement, Dr. Turner said, explaining that time spent enumerating, contemplating, and talking about a problem, debating details, or deferring to committees can cost valuable time and motivation.

“The ACS is here to support you,” Dr. Turner said. “We can help you move to the next level of quality, to move from good to great.”

The Power of Quality

While the focus for The Power of Quality campaign is on the future, Dr. Turner looked to the College’s history to reiterate its commitment to quality.

“For 110 years, we have been improving quality, we have been focused on quality, and it continues to be the principle that undergirds everything we do—centered on the surgical patient and focused on enhancing their care,” Dr. Turner said. “Because of this legacy, we know what you

need to be successful.”

Through the campaign, the ACS will work with hospitals to promote the use of their already implemented ACS Quality Programs and bring others into the fold in a way that patients, the media, payers, and policymakers immediately can understand.

The ACS is equipped to help you carry this message forward to all of your patients and all of your communities, she said, including through placement of the Surgical Quality Partner diamond, which is a visual representation of a hospital’s commitment to quality.

Building on Dr. Turner’s message, a follow-up session describing how the ACS can assist hospitals in amplifying The Power of Quality message, featured insights from Kirsten K. Edmiston, MD, MPH, FACS, vice-president of surgical safety and operations at Inova Health System in Falls Church, Virginia.

Dr. Edmiston provided an overview of northern Virginia’s Inova Health System, the first to

partner with the ACS in this new quality journey. She explained how its medical service lines and varying hospital sizes made it a good test case for the quality campaign, which in part is built on the foundation of the Quality Verification Program.

“There is nothing like the Quality Verification Program as an overarching construct to align everyone around quality improvement, which everyone agrees is vital,” Dr. Edmiston said.

Keynote Speaker Addresses Disability, Equity, and Access

Although surgery is increasingly diverse, barriers still exist for entering the field—both physical and figurative—for individuals with disabilities. In his keynote address, Oluwaferanmi O. Okanlami, MD, MS, a physician and former orthopaedic surgery resident who is paralyzed from the chest down, discussed how accommodating disability is a necessary part of equity.

For Dr. Okanlami, the director of student accessibility and accommodation services at the University of Michigan in Ann Arbor and assistant professor of family medicine, physical medicine and rehabilitation, and urology at Michigan Medicine, his neck injury was a role reversal.

“Despite being a physician at this point and surgical resident who took care of people with disabilities...I hadn’t recognized how inaccessible our world and our healthcare system are for individuals with disabilities,” he said.

It was an affecting experience for Dr. Okanlami to be a patient because he became intimately



aware that physicians often draw a line between themselves and patients when they or their colleagues could easily be a patient in the future. That line inadvertently can mean that physicians limit a patient with disability's access to the care because the physicians may not understand the patient's needs.

That lack of recognition of necessary accommodations also can become present when an individual with disabilities seeks a career in surgery.

Dr. Okanlami worked to show he could continue to operate by accessing tools such as a standing wheelchair to give him the positioning needed to perform surgery. While he was granted accommodations, he said changing healthcare to make such accommodations equitable and accessible for all individuals, especially trainees, will take effort.

"It is culture change that we need to see that recognizes that a trainee with a disability should not be seen as less than a trainee without," he said. "Rather than limiting a candidate based on what you think they cannot do... you can build ramps to give an

entire demographic of individuals who currently are not seen as competent or qualified to do this work the opportunity to revolutionize the field of surgery."

The Equity Imperative in Quality Improvement

Although the Institute of Medicine (now the National Academy of Medicine) included equity as a domain of healthcare quality more than 20 years ago, progress toward ensuring equitable care for all demographics in the US has been slow and uneven. Health equity experts discussed why and how equity can be integrated into surgical QI in a well-attended panel discussion.

In discussing the ACS's role in promoting equity in health, Bonnie Simpson Mason, MD, FAAOS, ACS Medical Director of the ACS Office of Diversity, Equity, and Inclusion (DEI), made clear that it is in service of the College's broader mission.

"Our highest priority at the College is surgical excellence for our patients," Dr. Mason said, "When we talk about equity, it is necessary to achieve excellence."

She noted that while the diversity in DEI tends to receive significant attention, the College also aims to foster "inclusive excellence," where "anybody who identifies from a diverse background in any number of areas is included in the work—rural hospitals and patients, those who have language needs, and beyond."

To that end, the new ACS Equity in Quality Initiative will bring together the ACS Office of DEI and the Division of Research and Optimal Patient Care to create equity standards for ACS Quality Programs.

The ACS also should look to another framework for surgical quality improvement, according to panelist Ronald Wyatt, MD, MHA, chief science officer for the Society to Improve Diagnosis in Medicine. The Quintuple Aim, which builds on the well-known Triple Aim, helps improve the US health system by addressing well-being as well as equity.

"You have to commit to crossing the Rubicon [of hesitation or inaction] to get to the Quintuple Aim," Dr. Wyatt said. "We can't pick and choose



Did you attend the conference? Make sure to claim CME credits by October 13, 2023. Visit facs.org/qsc2023 for more information.

what aims are easiest. You need to commit to all of them.”

Dr. Wyatt framed his discussion through the lens of safety and equity, suggesting that there is no patient safety without equity; no patient equity without safety; and that equity cannot be assumed, it is a goal that takes active participation.

Healthcare equity is vital, as Black and Brown patients suffer from these disparities most severely, he said, adding that inequity is an unsafe condition that leads to adverse events, harm, and death. He noted that surgeons “have the influence and capability to commit to abolishing inequity from healthcare.”

Returning for the panel session, Dr. Okanlami continued a discussion on the themes he explored in his keynote address. As a Black disabled individual, he said that he understood the difficulties of finding a sense of place or authority in a health system, even if you are familiar with it.

“When you come into a system that was not built with you in mind, when you come into a space that clearly makes you know that as a young disabled person of color, you are not what we see as a leader in this space, you feel as if you do not have the opportunity to speak up—that the system wasn’t made for you,” he said.

Dr. Okanlami explained that he drew on his passion for fitness to help create the Adaptive Sports & Fitness program at the University of Michigan, which provides access to physical activities to disabled and nondisabled individuals alike.

Initiatives like these can “destigmatize disability by creating access,” he said, which can have a positive effect on attitudes that influence healthcare quality.

The 2024 Quality and Safety Conference will take place next July in Denver, Colorado. **B**

Matthew Fox is the Digital Managing Editor in the ACS Division of Integrated Communications in Chicago, IL.



Are Early Specialization and Integrated Subspecialty Training the Fast Track to the Future?

Kevin Koo, MD, MPH, MPHIL

Rachael M. Essig, MD

Michael R. Visenio, MD



The Resident and Associate Society (RAS) Advocacy and Issues Committee will host the annual RAS Symposium at the ACS Clinical Congress, October 22–25, in Boston, Massachusetts.



THIS YEAR'S SYMPOSIUM—taking place on Sunday, October 22—will explore whether fast-tracking and early specialization are the evidence-based future of surgical training or an unsustainable solution that may exacerbate the problem it is intended to address.

Once upon a time, all surgeons were general surgeons who performed operations from head to toe. Surgical training was by definition “general” because surgical practice required it. Since then, the number and complexity of surgical procedures have multiplied, and the expertise to perform them has been organized into dozens of subspecialties.

Is the philosophy that all surgeons should first be general surgeons still a fact or just a fairy tale?

Models for Early Specialization

Years ago, some specialties transitioned away from the general surgery model. Orthopaedic surgery, otolaryngology—head and neck surgery, and urology are 5-year

categorical residency programs. Many plastic and reconstructive surgery programs now are structured in an integrated format, combining 3 years of multidisciplinary surgical training with 3 years of primary plastic surgery experience.

Cardiothoracic surgery training follows one of three pathways: the traditional 2- or 3-year residency following 5 years of general surgery training; an integrated 6-year pathway; or a fast-track pathway offering surgery residents early entry into a 3-year cardiothoracic surgery training program after 4 years of general surgery.

Reported advantages of the integrated pathway include the development of wholly integrated models that allow for complementary general surgery rotations, increased trainee focus on the most pertinent skills and techniques, and sufficient flexibility to prioritize the best interests of the trainee.¹

Accelerated training time does not necessarily adversely impact case volumes



or board certification rates. Initial graduates of the early specialization program in vascular and cardiothoracic surgery, for instance, passed general surgery and specialty exams at a higher rate than general candidates.² Integrated vascular surgery residents had comparable vascular surgical experiences compared to vascular surgery fellows and recorded significantly more major vascular procedures.³

In an era when surgical trainees report record-high rates of professional burnout^{4,5} and the majority go onto subspecialty fellowships, early specialization has the potential to reduce the number of years in training, focus trainees' time on achieving expertise in practice-relevant procedures, and accelerate the supply of surgeons to meet a widening workforce shortage.

Unintended Consequences of Fast-Tracking

But the potential disadvantages of shuttling the next generation of surgeons into accelerated training pathways are not trivial.

As critical access hospitals

consolidate or close, a lack of general surgical care for rural patients could worsen the urban-rural outcome divide. Early specialization would necessitate medical students to commit to a specialty, sometimes before exposure to or experience in the breadth of surgical care. And as healthcare shifts toward a value-based model of reimbursement, subspecialization could contribute to more fractured care pathways.

For specialties accustomed to trainees who have already completed 5 to 7 years of surgical residency, an integrated pathway commits the program to working with younger, less-experienced learners.

Attrition rates in the integrated 6-year cardiothoracic surgery pathway have received particular attention. One suggested strategy is to make multiple pathways available at an institution and have the flexibility to make up for potential vacancies when residents leave the program.¹

This year's RAS Symposium will feature a discussion on early specialization and integrated subspecialty training as the default model for all surgeons—

from trauma to cardiothoracic, from critical care to colon and rectal, from plastics to primary care surgery.

What is the future of surgical practice, and how should the structure of surgical training reflect the personal and professional needs of trainees to ensure clinical competency and career longevity?

Join the debate during the RAS Symposium, as RAS members and ACS leaders weigh the benefits and drawbacks of early specialization, identify potential impacts on trainees, training programs, and surgical patients, and make a compelling case that reflects the needs and demands of contemporary surgical training in the 21st century. **B**

Dr. Kevin Koo is an associate professor of urology at the Mayo Clinic in Rochester, MN. He also chairs the ACS RAS Advocacy and Issues Committee.

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Participate in New Virtual Course on Using AI and ML in Surgery

Artificial intelligence (AI) and machine learning (ML) are comparatively new fields and only recently have efforts begun to develop applications of these models for surgical practice and education. A new virtual course from the ACS highlights the essential principles of AI and ML.

In *Artificial Intelligence and Machine Learning: Transforming Surgical Practice and Education*, participants will develop the foundational knowledge of the principles on which AI and ML are structured and may identify opportunities for possible application of the technologies to their practices. With further development, data-driven machine intelligence most likely will be able to inform clinical decision-making and allow surgeons to more accurately assess risk, predict disease progression, and manage patients with early stages of disease.


Specific examples and algorithms illustrated in this course include:

- Predicting the risk of small bowel obstruction during a specified period of time after a procedure
- Enhancing the diagnosis and malignancy prediction of indeterminate thyroid nodules
- Improving the diagnosis and management of patients in the earliest stage of breast cancer

Limitations and ethical considerations of ML in practice also are presented. The course should assist surgeons and leaders in surgery departments with developing some fluency in the principles and language of AI and ML to facilitate conversations between

leadership and technical experts.

Led by a knowledgeable faculty, this introductory course will help build a foundation to use these quickly evolving technologies.

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Member News

Friedrichs Heads New White House Pandemic Response Office



Dr. Paul Friedrichs

Retired US Air Force Major General Paul A. Friedrichs, MD, FACS, is leading the efforts of the new Office of Pandemic Preparedness and Response Policy as the inaugural director and principal

advisor on pandemic preparedness and response. This permanent executive office is aimed at leading, coordinating, and implementing actions to prepare for and respond to pathogens that could lead to a pandemic or significant public health-related disruptions in the US.

Dr. Friedrichs, a urologist, currently serves as special assistant to the President and senior director for global health security and biodefense at the National Security Council. He previously was a joint staff surgeon at the Pentagon, where he coordinated all issues related to health services, provided medical advice to the chair of the Joint Chiefs of Staff, and served as medical advisor to the Department of Defense COVID-19 Task Force. An ACS Fellow since 2000, Dr. Friedrichs has provided care for hundreds of patients injured in combat and has a history of service addressing public health challenges, domestically and abroad.

Sakran Is Vice-Chair of Surgery at Johns Hopkins



Dr. Joseph Sakran

Trauma surgeon Joseph V. Sakran, MD, MPA, MPH, FACS, has been promoted to executive vice-chair of surgery at Johns Hopkins Medicine in Baltimore, Maryland. He also serves as director of emergency general surgery, associate chief in the Division of Acute Care Surgery, and associate professor of surgery.

Dr. Sakran has held several positions within the ACS, currently serving as a Governor in the Health Policy and Advocacy Workgroup and President of the Maryland Chapter. He previously chaired the ACS Resident and Associate Society. In addition, Dr. Sakran is widely recognized for his commitment to addressing firearm violence and surgical volunteerism.

Clarke Is Chief of Surgical Oncology at Medical College of Wisconsin



Dr. Callisia Clarke

Callisia N. Clarke, MD, MS, FACS, FSSO, is now the chief of the Medical College of Wisconsin Surgical Oncology in Milwaukee.

Dr. Clarke previously served as an associate professor and surgical oncologist at the Froedtert Hospital Cancer Center at the Medical College of Wisconsin. For the ACS, she serves on the Committee to Advance Diversity, Inclusion, and Equity, as well as the Cancer Research Program Education Committee. Earlier this year, she was named president-elect of the Association for Academic Surgery.

Stewart Leads Surgery at Morehouse



Dr. John Stewart IV

John H. Stewart IV, MD, MBA, FACS, is the new chair of the Department of Surgery at the Morehouse School of Medicine (MSM) in Atlanta, Georgia. In addition, Dr. Stewart will begin roles as chief of surgery for Grady Health System and associate dean for oncological programs at MSM.

Dr. Stewart, an oncologic surgeon, previously served as a professor of surgery at the Louisiana State University (LSU) Health New Orleans School of Medicine and founding director of the LSU-Louisiana Children's Medical Center Health Cancer Center in Baton Rouge.

For the ACS, Dr. Stewart chairs the Advisory Council Chairs, as well as the Advisory Council for General Surgery. He also is a member of the ACS Foundation Board of Directors.



Have you or an ACS member you know achieved a notable career highlight recently? If so, send potential contributions to Jennifer Bagley, MA, *Bulletin* Editor-in-Chief, at jbagley@facs.org. Submissions will be printed based on content type and available space.

Mansour and Goldberg Will Help Guide the ABS



Dr. Ashraf Mansour



Dr. Amy Goldberg

Two ACS Fellows—M. Ashraf Mansour, MB, BCH, FACS, and Amy J. Goldberg, MD, FACS—recently were elected as chair and vice-chair, respectively, of the American Board of Surgery (ABS) for 2023–2024. In these positions, Drs. Mansour and Goldberg will work with the ABS Council (previously the Board of Directors) to guide the organization in its mission to provide leadership in surgical education and practice, as well as certification.

Dr. Mansour is chief of vascular surgery at Spectrum Health Medical Group Department of Surgical Specialties in Grand Rapids, Michigan. He previously served on the ABS Council and as vice-chair of the ABS Vascular Surgery Board. For the ACS, he is a member of the Committee on Trauma and has been an active leader of the Michigan Chapter, serving as Chapter President 2017–2018.

Dr. Goldberg, a trauma surgeon, is the Marjorie Joy Katz Dean of the Lewis Katz School of Medicine and the George S. Peters, MD and Louise C. Peters Chair and professor of surgery at Temple University in Philadelphia, Pennsylvania. She previously served on the ABS Council. She also was an ACS Governor and Chair of the Nominating Committee of the Board of Governors.

Cleary Is Chair of Surgery in Toronto



Dr. Sean Cleary

Sean P. Cleary, MD, MSc, MPH, FACS, FRCSC, has been appointed the Bernard and Ryna Langer Chair of the Division of General Surgery in the Department of Surgery at the University of Toronto in Ontario.

Before this new position, Dr. Cleary, a hepato-pancreato-biliary surgeon, was chair of the Division of Hepatobiliary and Pancreas Surgery, as well as vice-chair (Education) of the Department of Surgery, deputy director of disease groups at the Comprehensive Cancer Center, and chair of hepatobiliary and pancreatic disease group at the Mayo Clinic in Rochester, Minnesota.

Dr. Cleary has been an ACS Governor since 2017, currently serving as a member of the Member Services Pillar.

Steele Is Promoted at the Cleveland Clinic



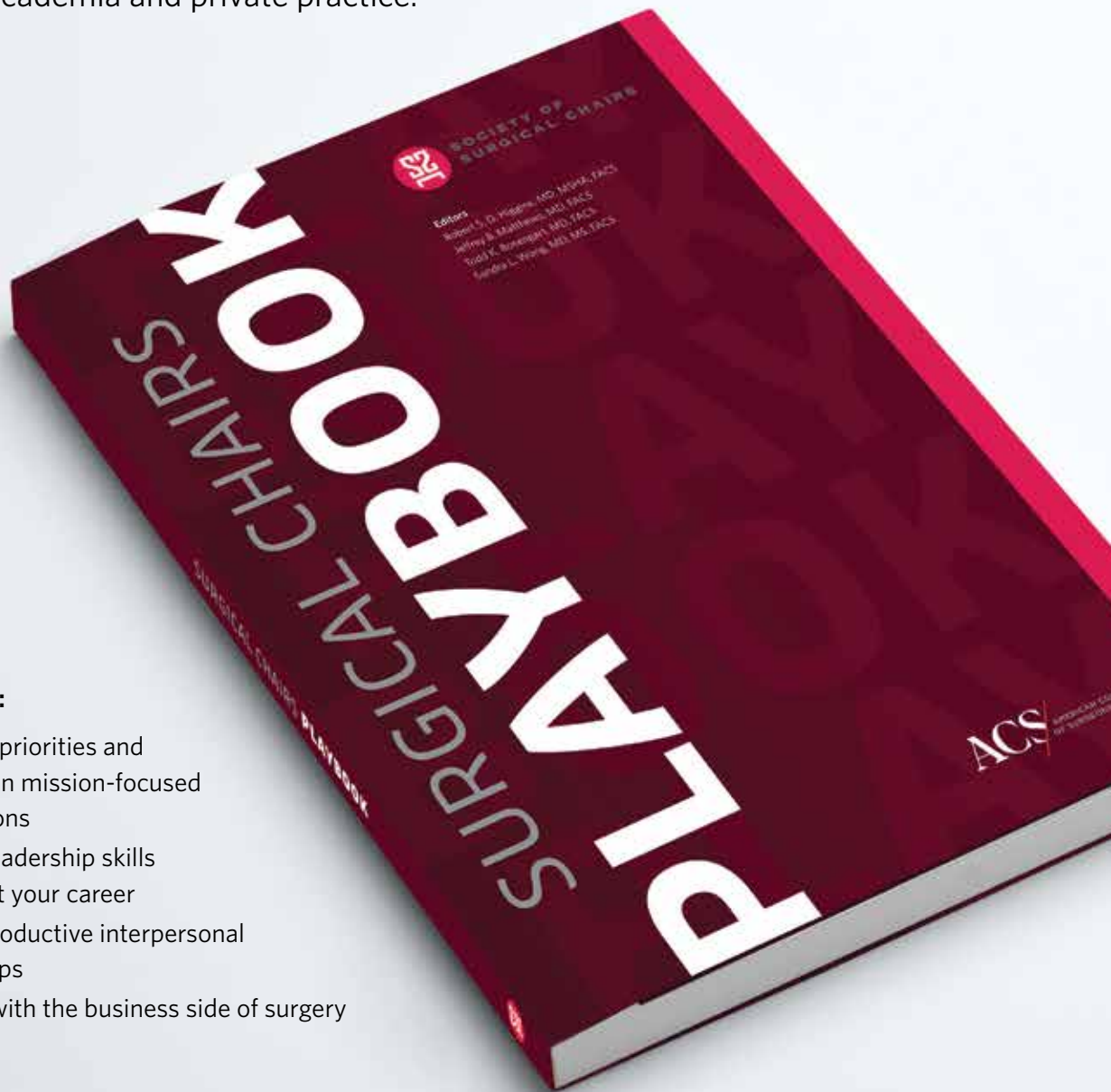
Dr. Scott Steele

Colorectal surgeon Scott R. Steele, MD, MBA, FACS, has been named president of the Cleveland Clinic main campus in Ohio.

Since 2016, Dr. Steele has served as chair of the Department of Colorectal Surgery. He also holds the Rupert B. Turnbull, MD Endowed Chair in Colorectal Surgery position and is a professor of surgery through the Cleveland Clinic Lerner College of Medicine of Case Western Reserve University. A former Army physician, Dr. Steele served 25 years in the military, including combat deployments to Iraq and Afghanistan. He has been an ACS Fellow since 2006. **B**

New Publication for Current and Aspiring Leaders in Surgery

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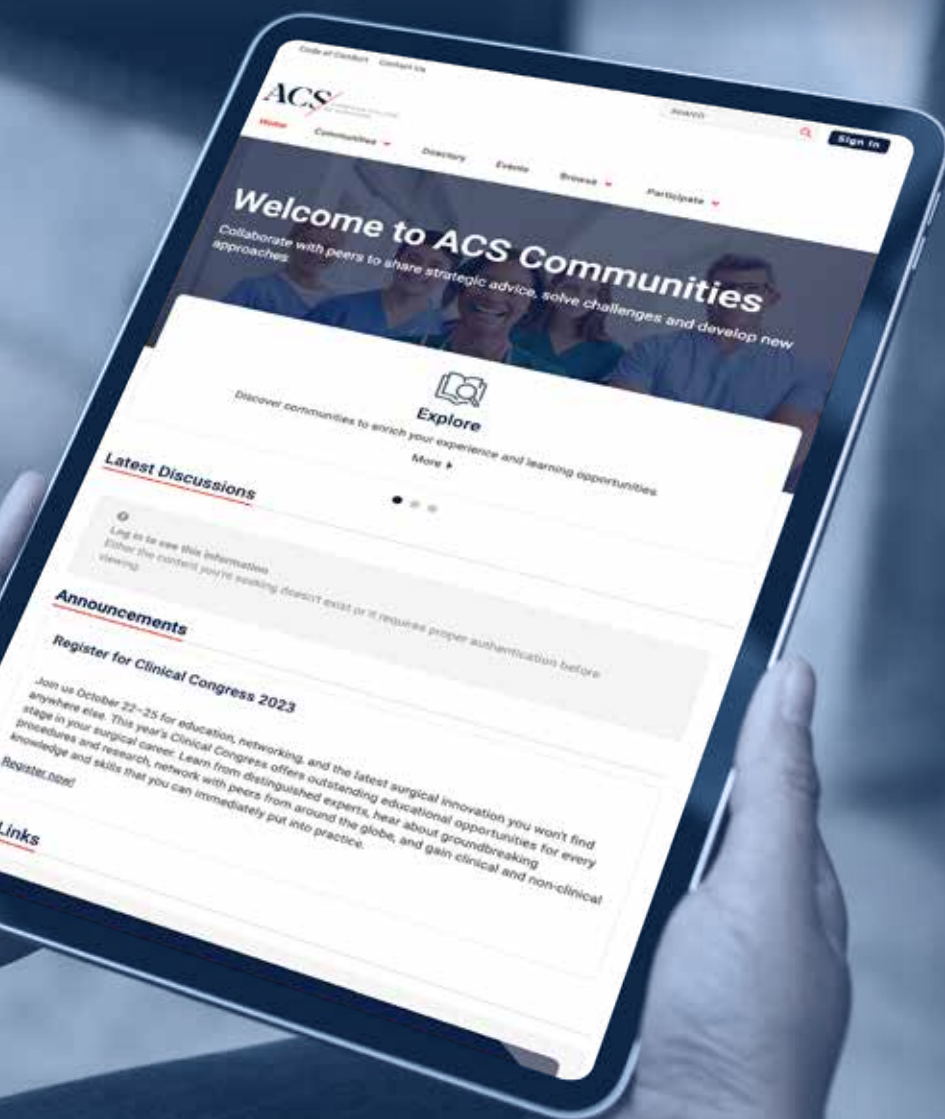


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