FEBRUARY 2024 / VOLUME 109 / NUMBER 2

# ACS Bulletin

AMERICAN COLLEGE OF SURGEONS

## Humanizing the Esophagectomy

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Grave Robbing, Cadaver Acquisition

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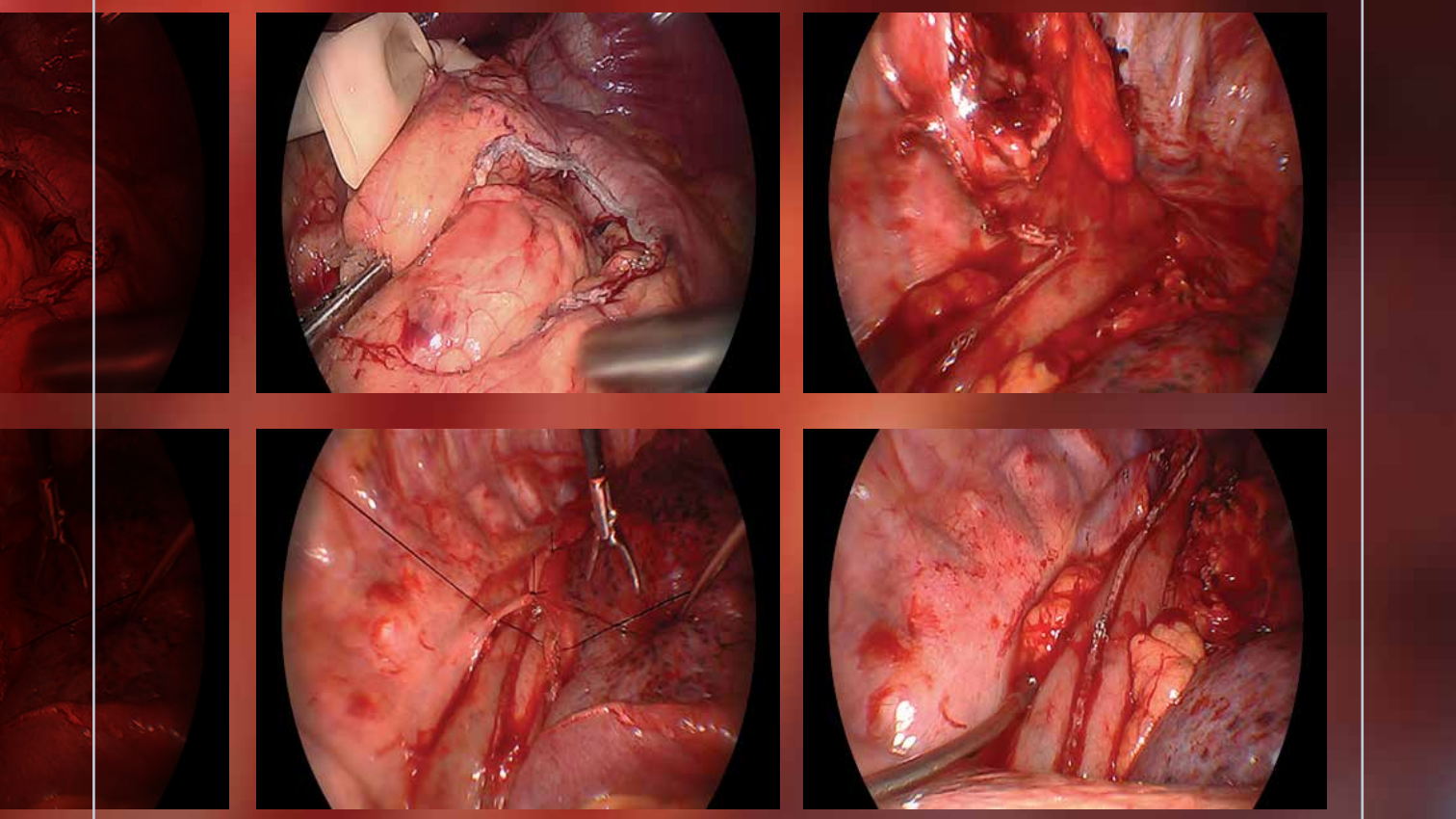

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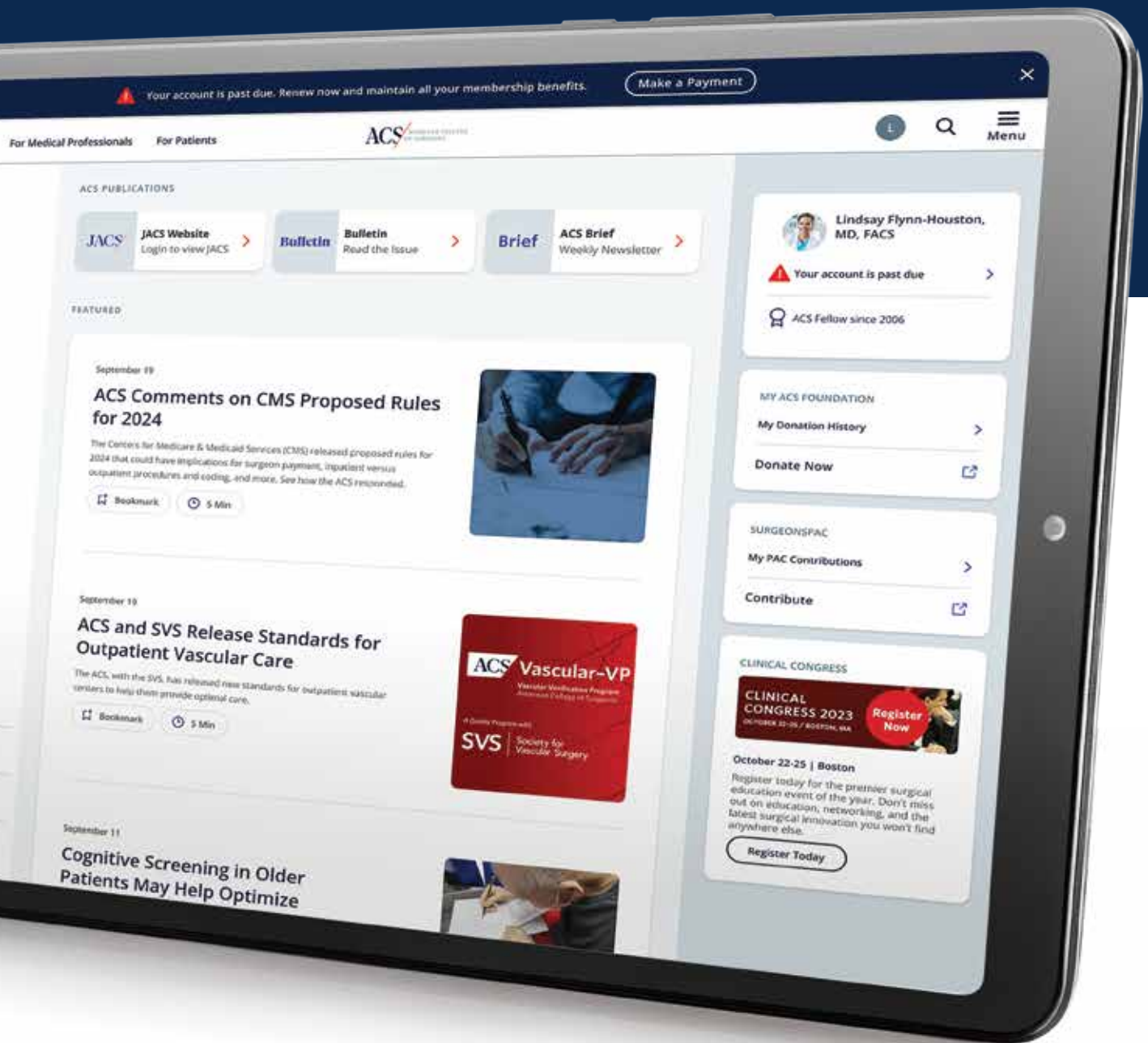


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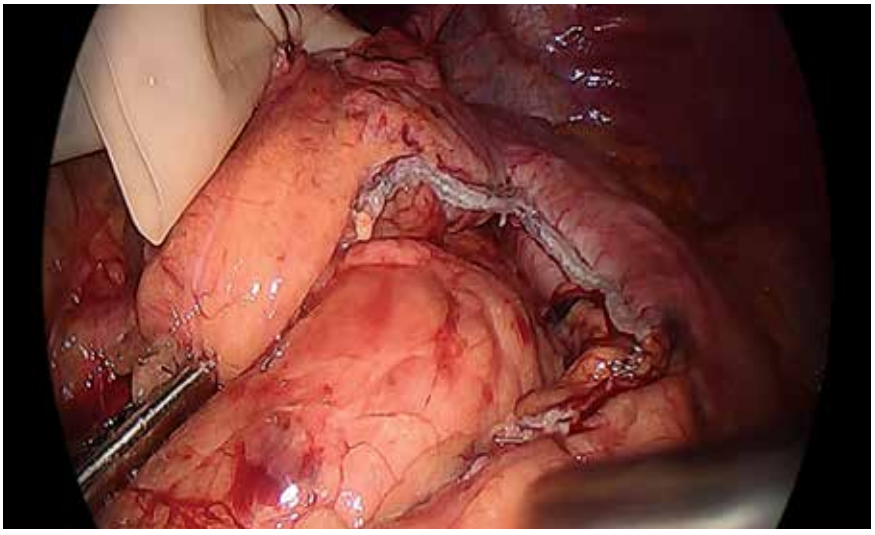

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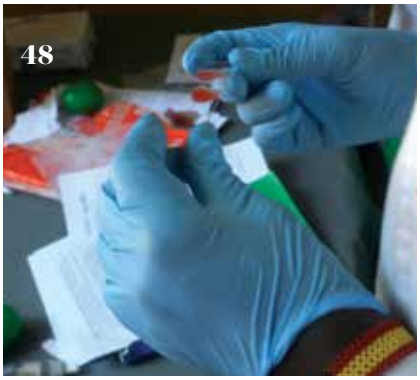


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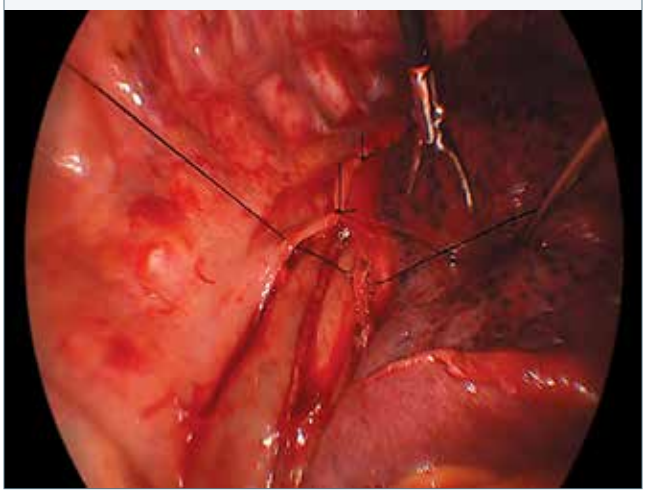

*Letters to the Editor should be sent with the writer's name, address, email address, and daytime telephone number via email to jbagley@facs.org. Letters may be edited for length or clarity. Permission to publish letters is assumed unless the author indicates otherwise.*

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# In the House of Surgery, Pediatrics Is in Every Room

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THE AMERICAN College of Surgeons is the largest organization of surgeons in the world, representing surgeons in 144 countries. As such, we expect our members to hold a wide range of opinions on various issues.

There are areas, however, on which everyone worldwide seems to agree. Our collective interest in prioritizing the well-being of children is one such topic.

The ACS was founded in 1913, several years before pediatric surgery first emerged in the US (under the influence of the legendary pediatric surgeon **William E. Ladd,** MD, FACS). The ACS's motto, "To Heal All with Skill and Trust," which has been in use since our founding, of course includes patients of all ages.

Because we are the House of Surgery, our experiences with and contributions to pediatric surgery go well beyond our motto. In October, we initiated a pediatric surgeon, **Henri R. Ford,** MD, MHA, FACS, as ACS President. He brings an impressive track record of achievements in surgery, research, and leadership to the role, including in neonatology and pediatric global surgery. "I chose pediatric surgery because that's the discipline where I felt I could make the biggest difference," Dr. Ford said in his Presidential Address. Later, in conversation, he added, "Pediatric surgeons ought to play a role in the entire spectrum of activities that the American College of Surgeons represents."

In many ways, they do. In addition to Dr. Ford's leadership, we enjoy the presence of three pediatric surgeons on our Board of Regents (**Don K. Nakayama,** MD, MBA, FACS, **Diana L. Farmer,** MD, FACS, and **Andrea A. Hayes Dixon,** MD, FACS), as well as several on the Board of Governors, Committee on Trauma, and elsewhere. A pediatric surgeon, **Patrick V. Bailey,** MD, MLS, JD, FACS, serves as Medical Director of our Division of Advocacy and Health Policy. These surgeons help lead the ACS as we work toward improving the care all children receive.

Quality improvement programs are central to the ACS mission, and in 2017, the ACS began offering Children's Surgery Verification (CSV). The CSV Program offers site visits and consultations that help ensure healthcare institutions meet quality standards for children's surgical care, as reflected in *Optimal Resources for Children's Surgical Care,* an ACS standards document. There are 59 hospitals with current CSV verifications.

At many sites, the CSV Program incorporates use of the

ACS National Surgical Quality Improvement Program® (NSQIP) Pediatric registry, a complex database that expands on the original NSQIP, which includes only adult patients. NSQIP is a standard-bearing Quality Program with a long history—one of several at the ACS—and it provides valuable benchmarks for individual institutions and surgeons to understand and improve their surgical outcomes. Our NSQIP Pediatric registry includes data from more than one million pediatric surgical cases since 2012, including pediatric neurosurgery, plastic surgery, orthopaedic surgery, and more.

Our pediatric surgery offerings extend into Trauma Quality Programs as well. In 2022, we released *Resources for Optimal Care of the Injured Patient,* which includes a pediatric verification standard that addresses how to evaluate pediatric trauma readiness. A pediatric trauma readiness score quantifies how ready a healthcare institution is to address the unique needs of injured children. In October 2023, the *Annals of Surgery* published a study examining 66,588 pediatric cases in 630 hospitals, using ACS Trauma Quality Improvement Program models of pediatric trauma readiness. The study found the greater the readiness scores at a given facility, the lower the mortality risk for pediatric patients.

There is work to be done to ensure healthcare centers are adequately prepared. **Ronald M. Stewart,** MD, FACS, a past-Chair of the ACS Committee on Trauma, has said: "At least one-third of Americans today live in an area without a complete trauma system, and tens of thousands of lives are lost unnecessarily each year. This is the most important health problem facing our children."

With this in mind, the ACS has steadily advocated for a National Trauma and Emergency Preparedness System. The intention is for pediatric patients, as well as all others, to benefit from improved coordination in trauma care. Indeed, the number one cause of death for US children is now firearm injuries, which underscores the importance of this work. This initiative is one of several pediatric surgery-related efforts our Advocacy and Health Policy team has pursued.

Beyond awareness of these efforts, there are many opportunities for pediatric surgeons in all specialties to engage with the ACS. Like me, Dr. Ford began his journey toward ACS leadership as an ordinary ACS member—in his case, of the Pittsburgh Chapter. Describing Clinical Congress, chapter participation, and contact with the ACS Advisory Council, he has said, "My message to my fellow pediatric surgeons is, 'Let's get involved early on with the College,' because we have so much to offer."

## Join Us for the 2024 Leadership & Advocacy Summit

Each year, hundreds of surgeons gather in Washington, DC, for our 3-day Leadership & Advocacy Summit, which is followed by Capitol Hill Day, when surgeons visit Congressional offices to share insights into surgical issues affecting their districts. Please join us to become part of positive change for surgeons and surgical patients, including in pediatrics. Register now at *facs.org/summit*.

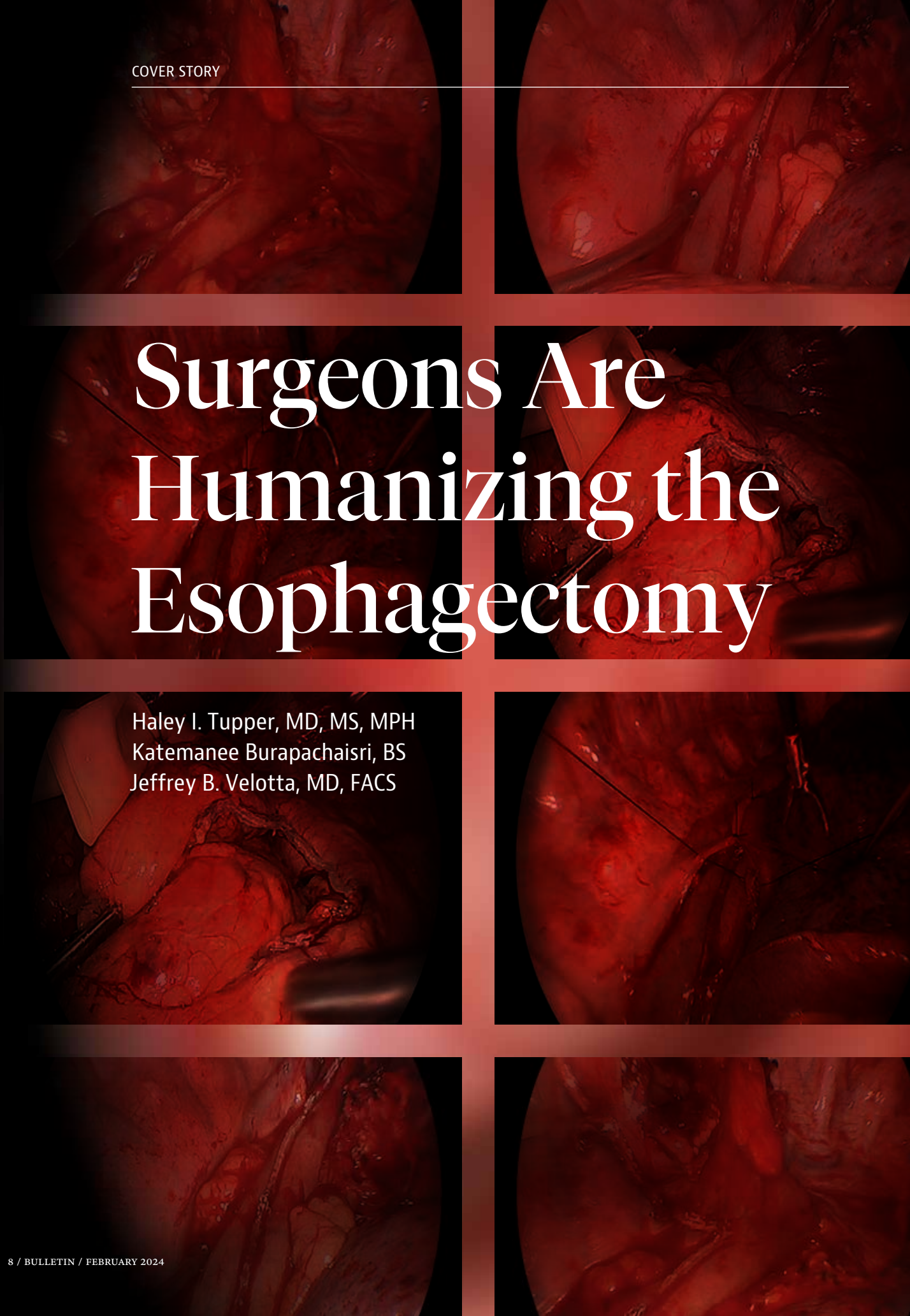
## Submit Your Abstracts to QSC 2024

Our annual Quality and Safety Conference (QSC) also highlights pediatric surgery. This year, we will meet in Denver, Colorado, July 18-22. If you'd like to present, please submit your abstract by February 29, at *facs.org/qsc2024.*

## Access Clinical Congress on Demand

Clinical Congress 2023 also featured many pediatric surgery presentations. Conference content and dozens of continuing medical education credits remain available until May 1, 2024, for all registrants. If you did not attend, registration for on-demand content remains open at *facs.org/clincon2023.*

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



# Surgeons Are Humanizing the Esophagectomy

Haley I. Tupper, MD, MS, MPH
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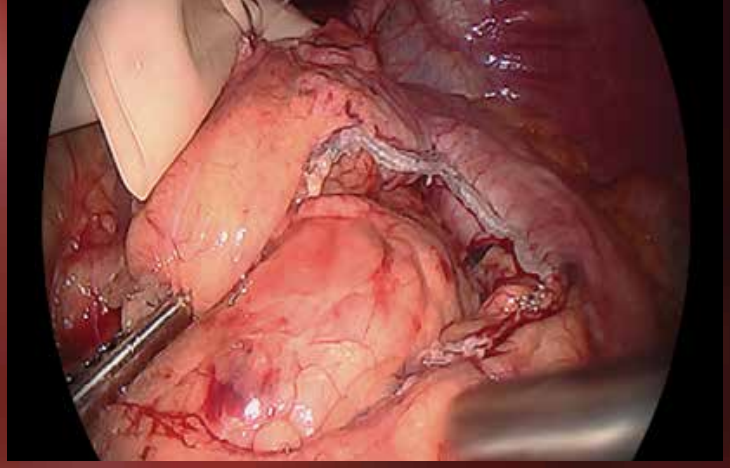
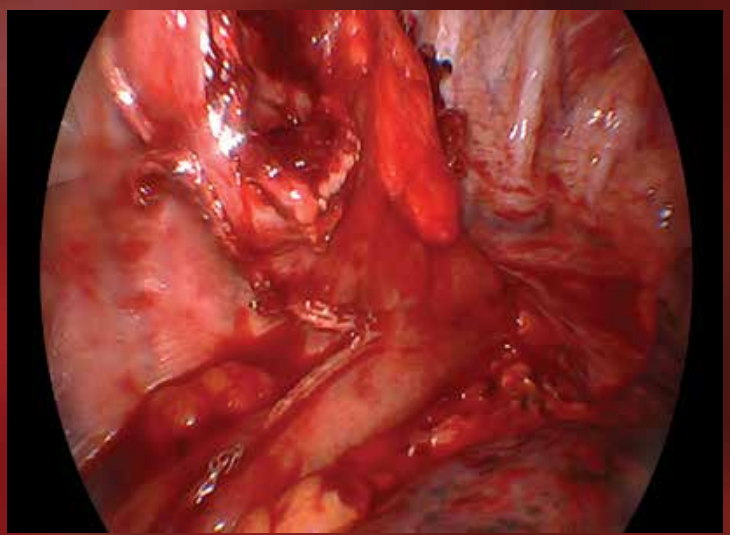
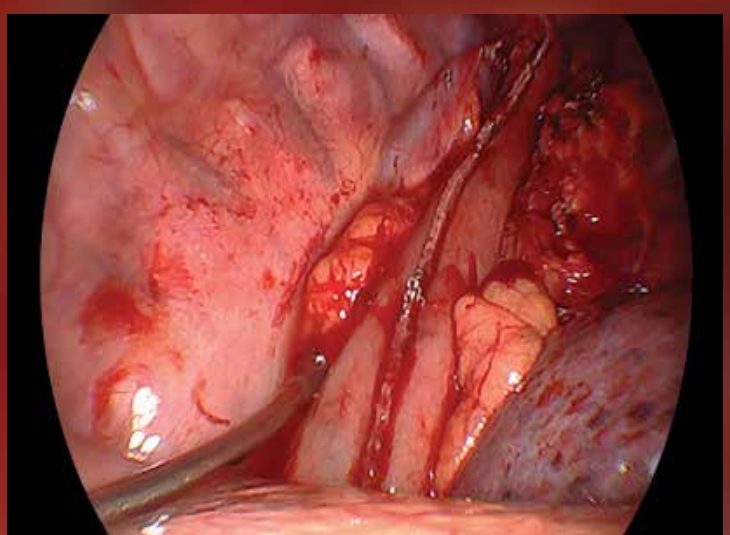
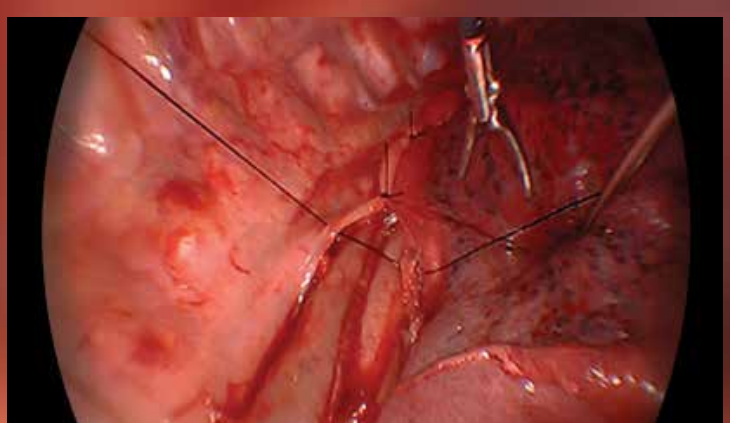








ESOPHAGECTOMY IS A COMPLEX, morbid procedure that is usually performed to treat esophageal cancer—a poor prognosis cancer with a median survival of 11 months.[1] Postoperative complications are common, affecting 59%–64% of patients, with "profound" short- and long-term negative effects, including early death.[2-4] Despite optimal treatment, a minority of patients survive beyond 5 years, often with significantly compromised health-related quality of life.[4,5]

The ideal esophagectomy would improve survival via reduced complications and good oncologic outcomes, while maximizing the patient's remaining quality of life. Research suggests that standardizing the surgical approach may be an important prognostic factor.[1]

In this article, we present our technical adaptations to the total minimally invasive Ivor Lewis esophagectomy (MIE) and our perioperative management strategy (see Figure 1, page 10). In particular, we emphasize mediastinal pleural envelope closure over a slender conduit with early structured oral nutrition, obviating the need for jejunostomy feeding tubes.

This approach is highly team-based and depends on regionalization of esophagectomy care to three specialized centers. Many aspects would not be possible without careful coordination and teamwork from nursing staff, registered dietitians (RDs), and inpatient and outpatient multidisciplinary care teams.[6]

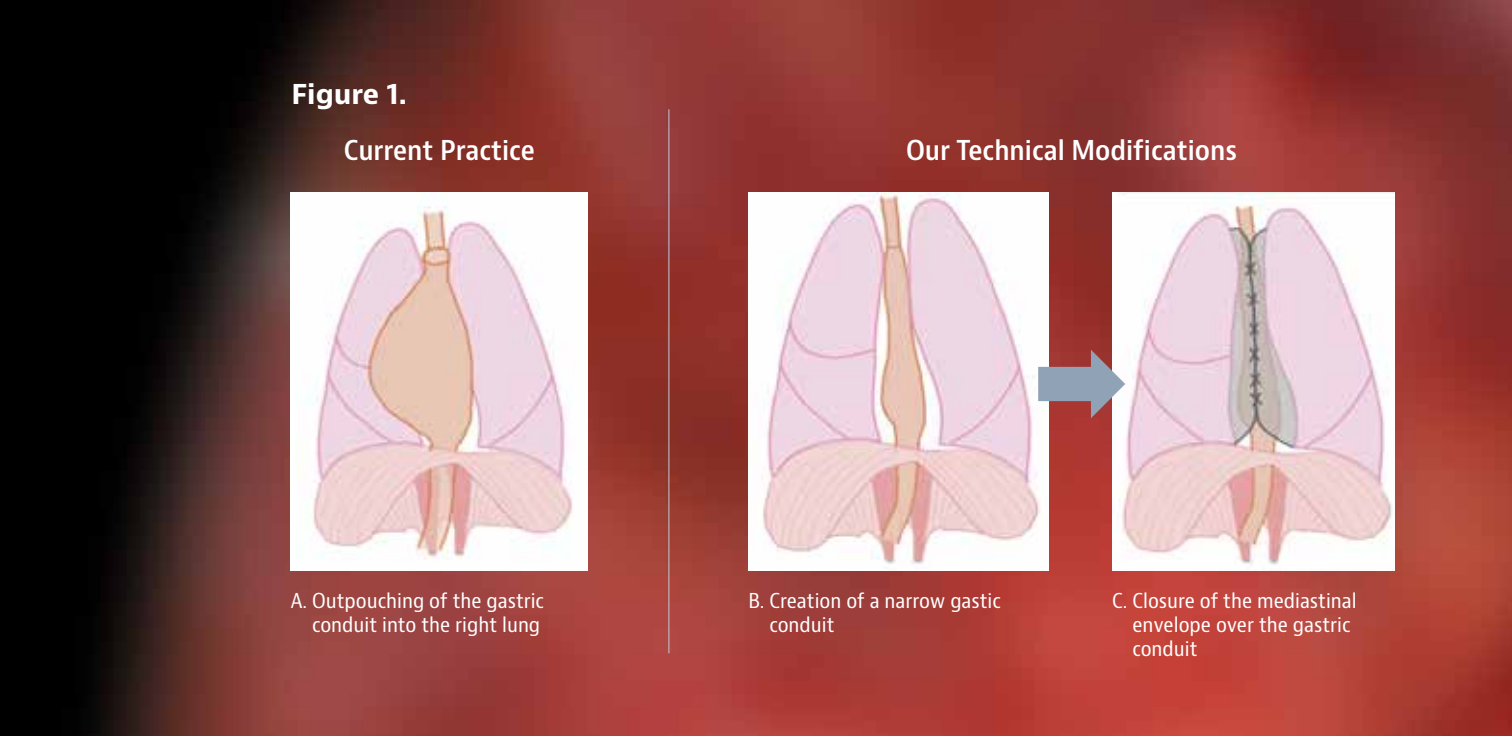



Figure 1: Our MIE modifications compared to current practice

## Part 1. Surgical Technique: Mediastinal Envelope Closure Over a Slender Conduit

The key component of our total minimally invasive Ivor Lewis esophagectomy is mediastinal envelope closure over a slender gastric conduit, facilitating early oral intake (see Figure 2, page 11).

In the laparoscopic phase, we first perform a standard hiatal dissection with mobilization of the stomach. Most of the omentum is removed from the gastric conduit, taking care to avoid the right gastroepiploic artery. A thin omentum both facilitates closure of the mediastinal envelope and minimizes shunting to inferior omental branches from the right gastroepiploic artery in the setting of ischemia. We then tubularize the stomach along the lesser curvature to allow for pull-up of the conduit into the thoracic cavity. We do not place a jejunostomy tube and omit a pyloric emptying procedure completely.

With the patient in left lateral decubitus (right video-assisted thoracoscopic surgery or VATS), the mediastinal pleura overlying the esophagus anteriorly is divided superiorly along the length of the mediastinum. Care is taken to preserve the divided pleural edge as the pleura and underlying connective tissue will ultimately be closed around the newly formed conduit.

Inferior to the posterior hilum, the inferior pulmonary ligament is composed of apposed bi-layered pleura that attach medially to the esophagus and inferiorly to the diaphragm. Beginning at the hilum, the divided pleura is a single layer of mesothelium. After neoadjuvant chemoradiation, this layer is often conveniently thickened, further buttressing the mediastinal envelope closure. Division of the pleura is carried out superiorly above the ligated azygous vein to the beginning of the thoracic inlet.

After full esophageal mobilization circumferentially, the esophagus is transected, and a 28 mm EEA™ stapler anvil is inserted into the proximal esophagus. To create a clean anastomosis, the anvil is secured with two consecutive chromic ENDOLOOP™ suture ties and excess tissue distal to the ENDOLOOP ties is removed. The gastric conduit is pulled up into the thoracic cavity with the staple line maintained to the patient's right to avoid torsion. A gastrotomy is made along the lesser curvature of the stomach near the staple line for EEA stapler insertion, and the spike is deployed at the cephalad aspect of the greater curvature, taking care to resect an often devascularized gastric fundus.

After docking the EEA spike and anvil, the esophagogastric anastomosis is created. The gastric conduit (external diameter <4 cm) is further slenderized on the lesser curvature side with exclusion and removal of the gastrotomy with the discarded specimen. The remaining omentum is interposed between the anastomosis and bronchi to protect against tracheoesophageal fistula formation in case of an anastomotic leak or dehiscence postoperatively.

We then close the entire mediastinal pleural envelope from the thoracic inlet above the anastomosis to the diaphragm with interrupted 2-0 silk sutures spaced 2 cm apart. If tension limits adequate envelope closure, the parietal and visceral pleura can be undermined on either side, similar to pleural tenting. Interrupted sutures are used to allow for potential mediastinal drainage between sutures and prevent unravelling if the conduit distends upon oral liquid initiation postoperatively. A 24 French Blake® Drain is placed over the closed mediastinal envelope near the anastomosis, along with

**Figure 2.**

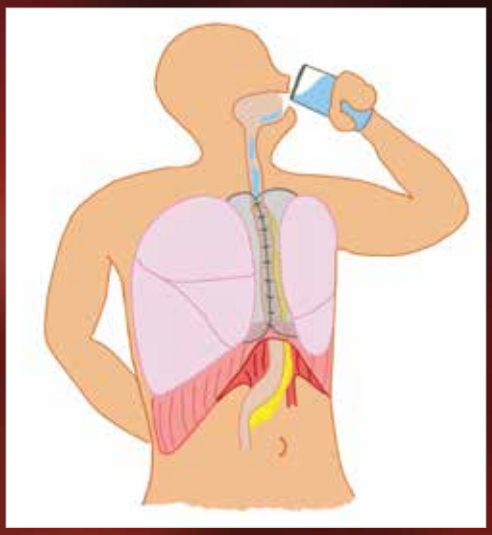
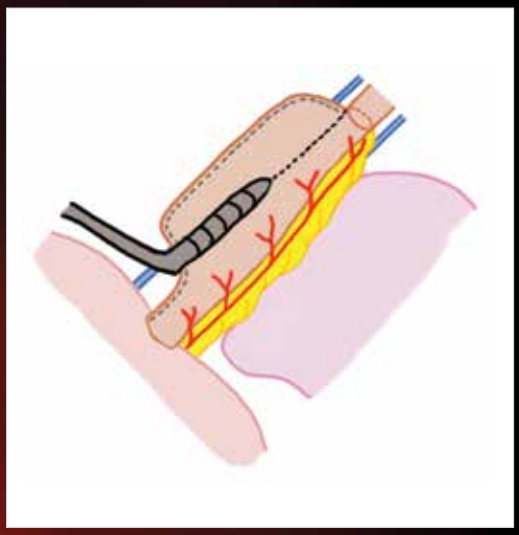


**Figure 3.**



a nasogastric tube (NGT) and a single 28 French chest tube. Before closure, we perform an intercostal nerve blockade with liposomal bupivacaine for postoperative pain control, avoiding thoracic epidurals mainly because of the associated hypotension.

We hypothesize that the slender conduit and mediastinal pleural envelope closure are advantageous for several reasons. Slender tubularization more closely resembles the native esophageal anatomy with a luminal diameter of 2–3 cm (see Figure 3, this page). The largely denervated gastric conduit is prone to dilation with loss of muscle tone. Significant luminal size discrepancies between the downstream pyloric sphincter and the upstream conduit may exacerbate conduit dilation and intraluminal stasis.

Exposure of a dilated conduit in the right hemithorax to the respiratory cycle also may increase aspiration risk. Closure of the mediastinal envelope offers several potential anatomic advantages. In the absence of mediastinal envelope closure, the conduit is suspended from the anastomosis and a few other points of tension. Anastomotic tension, exacerbated by gravity in the upright esophagectomy patient, impedes tissue perfusion and can be mitigated by creating a thinner conduit and subsequent mediastinal envelope closure. The mediastinal pleural envelope closure also maintains the conduit in a linear cephalocaudal position, promoting streamlined emptying through gravity.

Finally, the pleura is a natural protective barrier with blood supply from both the intercostal and pulmonary vasculature; the mediastinal envelope may function similarly to an omentoplasty without diverting gastroepiploic blood flow. We have found that partial closure of the mediastinal envelope (e.g., below the level of the anastomosis) does not reduce postesophagectomy complications as effectively as full closure of the mediastinal envelope.

The primary condition limiting mediastinal envelope closure is excess tension. Occasionally we cannot perform complete mediastinal envelope closure. When this is the case, we prefer to leave the entire mediastinal envelope open as we have found that partial closure can lead to increased anastomotic leaks (in press). Bulky conduits and excess omentum can impede closure, while preoperative radiation occasionally makes the pleura too friable. Although conduit revisions can be more complex with a slender conduit, we find that a slender conduit is less ischemia-prone, possibly because the right gastroepiploic artery's branches have a shorter distance to travel circumferentially with a reduced volume of tissue to perfuse.

In a multicenter retrospective cohort study of adult patients undergoing minimally invasive esophagectomy (in press), we found that complete closure of the mediastinal envelope led to improved outcomes compared to nonclosure or partial closure. Partial closure is defined as closure only below the level of the ligated azygous, leaving the anastomosis exposed.

The complete mediastinal envelope closure led to a statistically significant decrease in anastomotic leaks (2% vs. 14.7%, $p = 0.007$); delayed gastric emptying (6.1% vs. 20.6%, $p = 0.02$); need for pyloric dilation (15.6% vs. 32.4%, $p = 0.03$); length of stay (2 days vs. 4 days, $p < 0.001$); and 90-day hospital readmission (11.6% vs. 35.3%, $p = 0.001$).

In particular, patients with no or partial closure of the mediastinal envelope had 3.74 times increased

Figure 2 (left): Early oral intake facilitated by operative modifications

Figure 3 (right): Completing slender tubularization of the conduit after esophagogastric anastomosis

The relationship between operative duration and MIE complications is likely bi-directional. We do not endorse extreme speed, but recommend that surgeons prioritize purposeful, streamlined operative techniques.

odds of anastomotic leak ($p$ = 0.007). Anastomotic leak is associated with increased length of stay, stricture formation, morbidity, and mortality, but consistently effective interventions are limited. One meta-analysis found only omentoplasty (relative risk [RR]: 22%) and early NG tube removal (within 2 days) or no NG tube (RR: 38%) reduce the risk of anastomotic leak.[7] The techniques presented here may offer alternative solutions to reduce common and highly morbid complications for patients after esophagectomy.

In our MIE, we emphasize an efficient operation with deliberate surgical maneuvers. MIE offers several advantages over open esophagectomy, including reduced perioperative blood loss, respiratory infections, and length of stay with improved 1-year quality of life, but MIE also has a longer median operative duration in the literature by more than 30 minutes (MIE: 326 minutes vs. Open: 295 minutes).[8] Extended operative and anesthesia time may be uniquely harmful to esophagectomy patients for numerous reasons, including increased blood loss, tenuous conduit perfusion, and protracted single-lung ventilation.

In the laparoscopic phase, in addition to omitting routine jejunostomy tube placement, we do not perform pyloric emptying procedures (i.e., pyloromyotomy, pyloroplasty, or Botox®). Pyloric drainage procedures in MIE have been associated with increased postesophagectomy symptoms and the need for subsequent pyloric dilation.[9] Pyloric stenosis is addressed postoperatively as needed, but with the slender conduit and improved emptying due to mediastinal envelope closure, fewer patients require pyloric dilation.

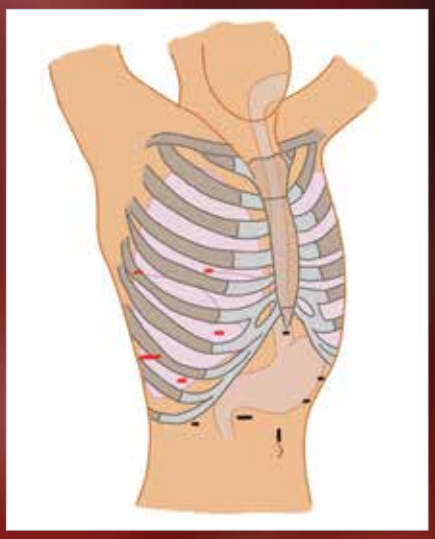
In the thoracoscopic phase, we specifically reduce single-lung ventilation time by using two ENDOLOOP ties to secure the stapler anvil, instead of a purse-string suture with an Endo Stitch™ or laparoscopic needle driver. In another multicenter retrospective cohort study of 368 patients (in press), where approximately one-third of MIE patients had operative durations <4 hours (240 minutes), we found that prolonged operations were associated with increased postoperative complications, specifically respiratory infections and anastomotic leaks. The relationship between operative duration and MIE complications is likely bi-directional. We do not endorse extreme speed, but recommend that surgeons prioritize purposeful, streamlined operative techniques.

## Part 2. Multidisciplinary Perioperative Management Emphasizing Early Oral Nutrition

Careful perioperative management of esophagectomy patients is essential, particularly with regard to nutrition. Esophageal cancer has the highest median pre-diagnosis weight loss of all cancers[2] and >10% reduction in body weight is common preoperatively.[10] After esophagectomy, weight loss and malnutrition continues to be a central issue. With loss of the stomach reservoir and accompanying malabsorption, studies indicate that two-thirds of patients lose more than 10% of their preoperative bodyweight and 20% lose more than 20% by 6-months postesophagectomy.[1]

Enhanced recovery after surgery (ERAS) pathways are multidisciplinary in nature and, on our team, a dedicated outpatient RD is a key decision-maker.[2] Ideally, esophagectomy is performed 6-8 weeks after the last radiotherapy session in our program,

**Figure 4.**



but the RD coordinates the timing of surgery with the team based on the patient's nutritional status as well. Surgery will be delayed if nutritional status is extremely poor.

Beginning 4 weeks before the anticipated operative date, the RD provides the patient with our MIE-focused diet book and meets with him or her weekly, providing tailored education, discussing nutritional goals, and monitoring their current weight. Following each appointment, the surgeon, physician assistant, and RD jointly evaluate the patient's surgical fitness in a virtual multidisciplinary conference.

Preoperatively, most patients can drink clear liquids until 2 hours before surgery. The surgical approach is as described earlier in this article. Postesophagectomy, patients recover on medical-surgical nursing floors without routine use of intensive care. Floor nurses and nursing supervisors are thoroughly educated on, and uphold the use of, our MIE ERAS pathway. Postoperatively, patients immediately are maintained with balanced crystalloid fluids infusing at 125 cc/hour and multimodal intravenous pain medication as needed.

Beginning on postoperative day (POD) 1, the inpatient RD meets with the patient daily until discharge. Consistent with recommended esophagectomy ERAS protocols, we remove the NGT and 28 French chest tube early on POD 1 on morning rounds with immediate oral initiation of a clear liquid diet along with a protein-dense, reduced-carbohydrate meal-replacement supplement. Although this supplement is not a clear liquid, it became a central component of our ERAS protocol after careful discussion with nutrition about the specific benefits for esophagectomy patients. It has the highest nutritional density and decreases dumping syndrome with 30 g of protein, 6 g of carbohydrates, and essential micronutrients.

We do not routinely perform an esophagram or obtain daily labs. Pain is minimized by minimally invasive incisions (see Figure 4, this page), long-acting liposomal bupivacaine, multimodal oral pain medication, and early chest tube removal. Most patients are discharged on POD 2 with a Blake drain and multimodal pain control (acetaminophen, gabapentin, ibuprofen) to reduce opioid requirements.

Upon discharge, the surgeon will call and/or text the patient daily for 10–14 days. Patients follow the MIE diet book provided preoperatively and resume their weekly virtual outpatient appointments with the team RD for a minimum of 4 weeks. On POD 5, patients are advanced to a full liquid diet, and on POD 9, patients are advanced to soft food with removal of the right pleural Blake drain in clinic. Finally, on POD 10, patients advance to regular diet.

Esophagectomy ERAS pathways vary widely. In comparison to our pathway, one highly regarded cancer center starts jejunostomy tube feeds on POD 2, removes chest tubes and NG tubes on PODs 3-4 in the absence of conduit stasis or dilatation concerns, initiates a clear liquid diet on POD 5, and generally discharges patients on POD 7 with removal of the jejunostomy tube 3 weeks after discharge.[11]

We believe our approach works well for several reasons. Intensive nutrition management for 8 weeks perioperatively not only improves short-term malnutrition and associated complications, but also provides lifelong education and nutrition management strategies for patients and their caregivers.

**Figure 4 (left):** Location of minimally invasive incisions

**Photos (right):** This patient underwent a minimally invasive esophagectomy, which required a series of small incisions in the abdomen and chest.

# MIE ERAS Pathway

## PREOP

- Esophagectomy is performed 6-8 weeks after the last radiotherapy session.
- Beginning 4 weeks prior to surgery, the RD provides patients with a diet book and meets with them weekly.
- After each appointment, the surgeon, PA, and RD jointly evaluate each patient's surgical fitness.

## POD 1

- Daily check-ups with the inpatient RD until discharge
- Removal of NGT and 28Fr chest tube
- Immediate oral initiation of clear liquid diet and BoostMax

## POD 2

- Discharged home with a Blake drain and multi-modal pain control
- Daily communication with surgeon via call/text for 10–14 days after discharge
- Resume weekly outpatient appointments with RD for at least 4 weeks

## POD 5

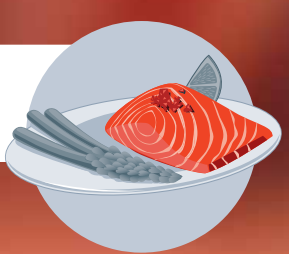
- Advance to a full liquid diet

## POD 9

- Advance to soft foods
- Removal of the right pleural Blake drain

## POD 10–14

- Advance to a regular diet as tolerated



Intraluminal nutrients may induce localized blood flow despite autonomic denervation[12], meaning early oral nutrition may stimulate greater blood flow to the conduit than jejunal tube feeds. One multicenter randomized controlled trial (NUTRIENT II) demonstrated comparable complication rates and improved long-term survival with oral intake beginning POD 1, while others have demonstrated reduced complications, including anastomotic leak.[13,14] Critical care data indicate that oral nutrition should be prioritized over other non-oral enteral feeding.[13] Meanwhile, jejunostomy tubes reduce quality of life, frequently malfunction, necessitating urgent outpatient management[15] and only defer, rather than prevent, weight loss postesophagectomy.[14]

### Good Outcomes and Improved Quality of Life

The consummate MIE pathway will provide superior oncologic outcomes, minimize complications, and provide the best quality of life. Even with optimal treatment, a minority of patients survive beyond 5-years postesophagectomy and one-third of patients with a complete pathologic response will recur in a median of 11.6 months.[16] Five years of data on our operative and perioperative approach highlight good short- and long-term outcomes compared to those reported in the literature, including a median length of stay of 3 days (vs. 7 days), a low proportion of anastomotic leaks (2.1% vs. 10-14%)[3,8], and 30-day readmissions (9.9% vs. 9%–15%) with a median survival of 4.6 years.[17]

When the life expectancy of most esophageal cancer patients is measured in months rather than years, each day matters. We must avoid the urge to

## When the life expectancy of most esophageal cancer patients is measured in months rather than years, each day matters.

practice defensively when there is no clear benefit. By closely approximating the original esophagus anatomy with mediastinal pleural envelope closure over a slender conduit and prioritizing early oral nutrition with close personalized monitoring and education in the perioperative setting, we are able to attain good outcomes and approach humanization of the esophagectomy. B

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Access related video content online.

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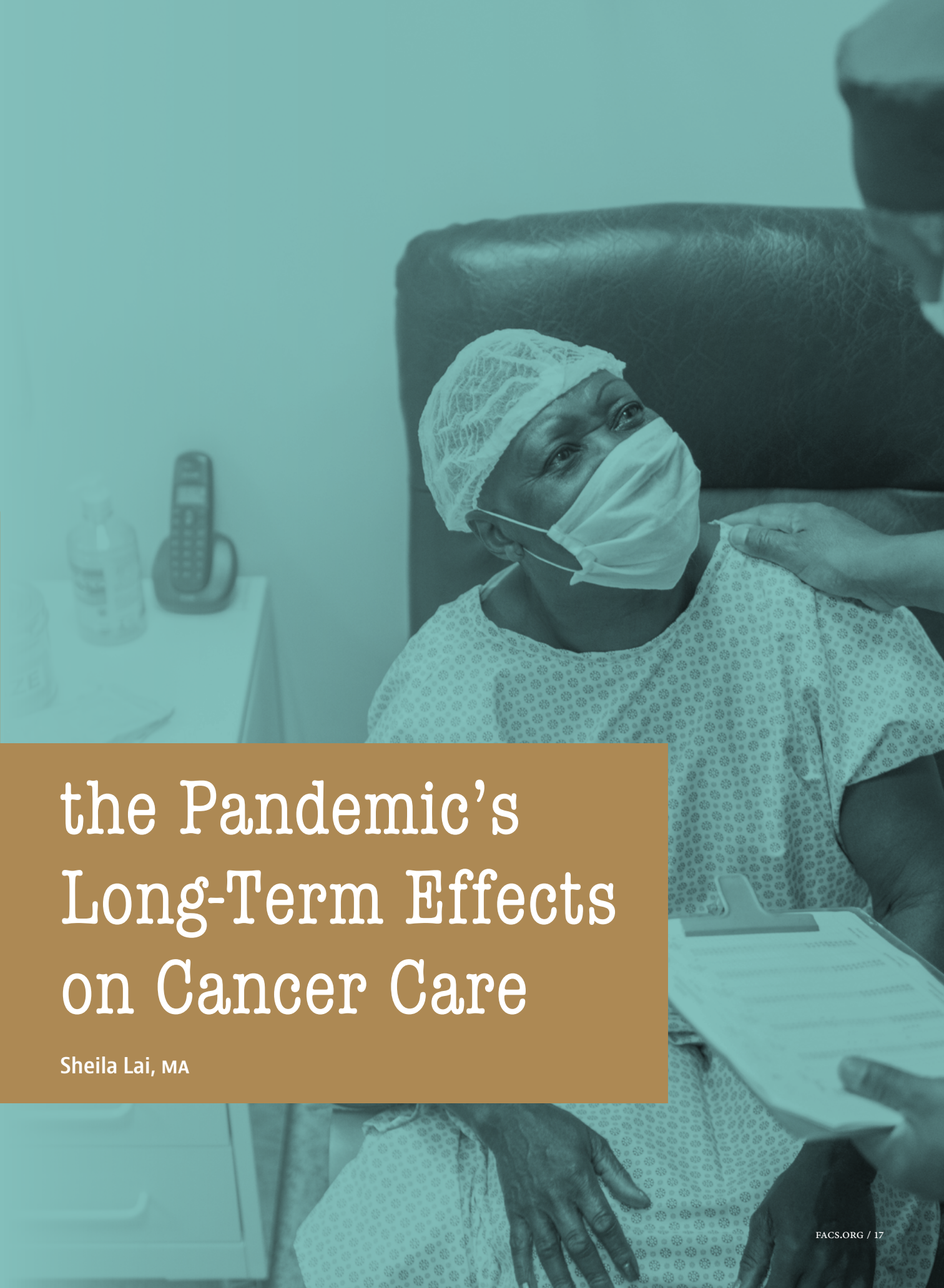
# Surgeons Seek to Understand



# the Pandemic's Long-Term Effects on Cancer Care

Sheila Lai, MA

In early April 2023, when the California Department of Public Health lifted its mask mandate in high-risk settings, Sharon S. Lum, MD, MBA, FACS, could finally see the faces of coworkers—some for the very first time. After more than 3 years of watching an unprecedented public health crisis unfold from the front lines, uncertainty about the pandemic remained, but some reprieve was finally in sight.

DR. LUM, WHO SPECIALIZES in breast surgical oncology, was one of thousands of frontline workers and ACS members who took care of cancer patients throughout the pandemic. Although memories of the pandemic are waning, surgeons are still grappling to understand the long-term effects the healthcare crisis may have had on cancer patients, who faced increased uncertainty about access to treatments as well as vulnerability to infection from COVID-19.

A growing body of research, much of it led by ACS members using the National Cancer Database (NCDB), demonstrates the distinct ways the pandemic disrupted cancer care and data reporting—and why continued research into these interruptions will be critical for understanding how to improve cancer care in the wake of future pandemics or public health emergencies.

## COVID-19 and Cancer: An Unprecedented Storm

Research into how the pandemic could potentially impact cancer care began early in 2020; from the start, surgical oncologists were at the forefront of both sounding the alarm and recognizing the need to guide cancer patients through complex treatment decision-making processes while keeping them safe from high-risk exposure settings.

One early report published by Chinese researchers in *The Lancet Oncology* in February 2020 showed that patients with cancer had a higher risk of contracting COVID-19 and had poorer outcomes from the infection, likely due to immunosuppression caused by chemotherapy and other treatments.[1] The authors proposed several strategies to protect vulnerable cancer patients, including postponing chemotherapy or elective surgery for certain patients with stable cancer.

"That was earth-shattering," Dr. Lum said of the research. "That report transformed how we took care of cancer patients more rapidly than any other in history."

Although cancer treatments did not completely halt during the pandemic, resources were still significantly diverted in many hospital systems, and pandemic-related restrictions and stay-at-home orders forced elective surgeries, preventive care, and routine screening services to pause, causing concern about access to life-saving measures.

After reviewing emerging research on the pandemic and cancer care, ACS Cancer Programs drafted triage guidelines for the surgical care of cancer patients in March 2020.[2,3] A year later, in response to growing concerns about missed cancer screenings related to COVID-19 restrictions and lockdowns, the Commission on Cancer (CoC) and the National Accreditation Program for Breast Centers launched a national Return-to-Screening Quality Improvement project to help accredited programs reduce local cancer screening deficits. That effort, co-led with the American Cancer Society, contributed to a significant number of additional screening tests and helped boost screening rates close to pre-pandemic levels.[4]

While that quality improvement project showed that early deficits of the pandemic could in some ways be corrected, NCDB data from 2020 revealed a multilayered picture of the pandemic and cancer care.

## Cancer Reporting Disruptions

In 2023, Dr. Lum and colleagues were able to, for the first time, evaluate a full year's worth of mature and complete data (2020) from the NCDB to understand how cancer reporting was disrupted. Data from the NCDB are used for a variety of research topics and quality improvement measures. In many ways, the NCDB is like a calm body of water: patterns emerge, but large waves of fluctuations generally do not occur in the historically stable dataset.

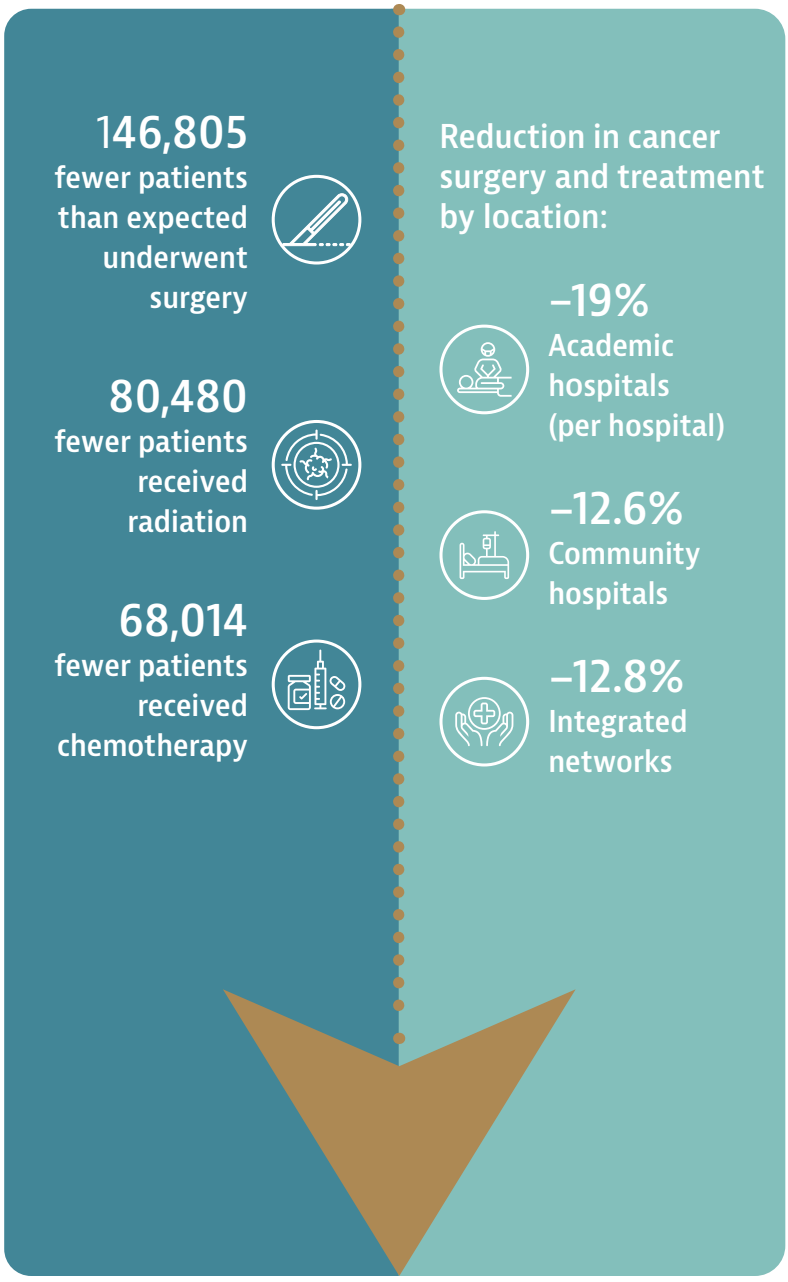
However, as Dr. Lum and coauthors analyzed the data, they noticed a startling trend: In 2020, there was a 14.4% overall decline in the number of reported cancer cases in the NCDB compared with 2019, representing more than 200,000 fewer cancer cases than expected that were not diagnosed and/or treated at CoC facilities.[5]

The research, published in *JAMA Surgery,* also revealed that certain racial, ethnic, and age groups were less likely to be diagnosed with cancer and/or receive cancer care, potentially exacerbating existing health disparities in cancer treatment.

The report serves as a "cautionary tale" that the depth of disruptions caused by the pandemic may still be underreported, and the interruptions caused by the pandemic will impact any report that includes 2020 data for years to come, potentially making it more challenging for researchers to observe certain trends.

"My main takeaway is to really look under the hood when using and analyzing NCDB data that from here on out will include data from 2020," Dr. Lum said. "Because what you assume is happening may not actually be happening, and you have to really take a deep dive into the treatment variables and particular disease process to understand

## First-Year COVID-19 Pandemic-Related Reductions in Cancer Care*




*Data from patients older than 18 years with newly diagnosed cancer and treated at CoC-accredited programs from January 1, 2018, through December 31, 2020

how the pandemic affected cancer care in your program."

### Missing Cancer Diagnoses

What happened to those 200,000 missing patients will be an area to study for years to come as more data reveal the complexities of pandemic-related disruptions to cancer care. The NCDB, a joint project of the CoC and the American Cancer Society, collects more than 1.5 million new cancer cases each year, representing more than 70% of all cancer cases in the US. The true incidence and scope of disruptions may be even larger beyond the 14% drop, and only by analyzing data after 2020 will a more complete story unfold.

"If there's one thing we know it's that cancer is not one disease. Cancer is so many diseases across the board, so we can't globally comment that cancer is one thing," said Heidi Nelson, MD, FACS, former Medical Director of the ACS Cancer Programs. "The pandemic is over; nobody wants to look back. But we have to understand what happened to 2020 data and other years of the pandemic as lessons learned and because it could have a downstream impact on all cancer programs."

Dr. Nelson coauthored the *JAMA Surgery* study with Dr. Lum and has co-led other research looking at the long-term effects of the pandemic on cancer care. So far, many studies have explored the way the pandemic uprooted the healthcare system, including cancer care, but the true size

and scope of the disruptions remain unknown, especially with studies involving smaller patient populations or those focused on regional variances or specific cancer types.

In October 2023, ACS scholars published research in *JAMA Network Open* looking at accessibility, availability, and utilization (defined by treatment modality and hospital type) of cancer treatment in 2020 compared with 2018 to 2019.[6] The study looked at NCDB data from patients older than 18 who were newly diagnosed with cancer and treated at CoC-accredited programs. According to the authors, the study is one of the largest, most comprehensive evaluations of cancer treatment during the pandemic to date.

The team found that patients diagnosed with cancer in 2020 had about the same access and availability to treatment compared with previous years, which they attributed to the steadfast efforts of healthcare providers who recognized the true scope of the global health crisis and ensured their patients newly diagnosed with cancer were able to get treated quickly.

However, some notable disruptions still occurred, with the researchers finding that overall, fewer cancer patients than expected received chemotherapy and underwent surgery or radiation:

- 146,805 fewer patients than expected underwent surgery; 80,480 fewer received radiation; and 68,014 fewer received chemotherapy.
- Academic hospitals experienced the greatest reduction in cancer surgery and treatment, with a decrease of approximately 19% per hospital compared with patients at community hospitals (–12.6%) and integrated networks (–12.8%).

The authors warned that these reductions could result in a large number of patients with untreated cancer, who could potentially face worse outcomes over the next several years. Separately, emerging research analyzing 2021 NCDB data suggests that cancer cases captured within the 2021 NCDB dataset did not return to pre-pandemic incidence levels, indicating that patients who went undiagnosed in 2020 were not captured the following year.[7] This finding suggests that a considerable number of patients, especially vulnerable immunocompromised patients, may have died during the pandemic before their cancer was diagnosed.

Follow-up studies, experts said, are crucial to understanding the long-term effects of COVID-19 on cancer care and long-term survival outcomes. Related research on stressors of the pandemic also could be applicable in instances of other national emergencies, including severe weather events or natural disasters, that have the potential to disrupt or impact cancer care.

"The pandemic was a scary time because in the early months, we didn't know how to manage patients with COVID," said Lauren M. Janczewski, MD, MS, first author of the *JAMA Network Open* study and a Clinical Scholar in Residence within the ACS Cancer Programs.

Dr. Janczewski was a first-year general surgery resident at Northwestern University in Chicago, Illinois, at the start of the pandemic. Since then, much of her research at the ACS has focused on the impact of the COVID-19 pandemic on the delivery of cancer care.

"Patients' families couldn't see them. They were frustrated, scared, and upset, understandably. And from a healthcare provider standpoint, we were physically exhausted, and there was a fear of becoming ill. Thankfully we've been able to overcome a lot of those things," she said. "But even though the public health emergency has been lifted, I think it's important for us to take a deep dive and evaluate cancer data from the pandemic as more become available. By doing this research, the lessons learned from the pandemic are applicable on a much broader scale."

## Quantifying Missed Diagnoses and Screening Delays

Recognizing that in cancer treatment, the stage of diagnosis can have a dramatic impact on treatment options and survival outcomes for patients, the

impact of missed diagnoses and screening delays related to the pandemic also remains an area of concern to surgeons and oncologists.

According to the 2023 Annual Report to the Nation on the Status of Cancer released by the National Cancer Institute (NCI) in October, new diagnoses of six major cancer types in the US—colorectal, female breast, lung, pancreas, prostate, and thyroid—plummeted in early 2020, coinciding with the early months of the pandemic.[8]

In particular, rates of early stage (in situ or localized) cancer diagnoses were lower for all studied cancers: colorectal (16.3% lower), prostate (14.8%), lung (14.7%), thyroid (11.8%), pancreas (9.9%), and female breast (9%).

By July 2020, diagnoses of all these cancer types except prostate cancer returned to pre-pandemic levels, but "these missed opportunities for early cancer detection are alarming, particularly for those vulnerable populations that continue to face significant barriers in accessing cancer care," Monica M. Bertagnolli, MD, FACS, said in a statement[9] when she was director of the NCI; she now is director of the National Institutes of Health.

For many, the report highlights an urgency to encourage patients to stay up to date on their screening tests and for surgeons to remain aware of a potential uptick in more advanced cancers as screening delays subside and a backlog of patients are treated.

Even with the public health emergency lifted, the impact of screening delays from the pandemic may cause a much greater impact on the medical community in future years, particularly on surgical oncologists, noted Teviah E. Sachs, MD, MPH, FACS, an associate professor of surgery at the Boston University Chobanian and Avedisian School of Medicine and chief of the Section of Surgical Oncology at Boston Medical Center in Massachusetts.

"While the medical system as a whole experienced an incredible burden from the COVID-19 pandemic, now we're going to see a much different burden present itself due to delays in cancer screening," he said.

Dr. Sachs coauthored research, published in the *Journal of the American College of Surgeons* in September 2023, that quantified the number of missed diagnoses of lung, breast, and colorectal cancers using NCDB data.[10] The team's predictive statistical model also included U.S. Census Bureau data to adjust for cancer cases not included in the NCDB.

The team analyzed data from 1,707,395 lung, 2,200,505 breast, and 1,066,138 colorectal cancer patients and found significant differences between the observed cancer rates in 2020 compared with predicted 2020 rates based on historical data from 2010 to 2019:

- Colorectal cancer: observed incidence decreased by 18.6%
- Lung cancer: observed incidence decreased by 18.1%
- Breast cancer: observed incidence decreased by 14.6%

"I think the magnitude of difference that we saw was

"While the medical system as a whole experienced an incredible burden from the COVID-19 pandemic, now we're going to see a much different burden present itself due to delays in cancer screening."

Teviah E. Sachs, MD, MPH, FACS

surprising. Anecdotally, from working in hospitals and being first responders during the pandemic, you saw all of this but to be able to quantify it and see that it was actually at this magnitude was pretty remarkable," said first author Kelsey S. Romatoski, MD, a surgical outcomes analysis and research fellow at Boston Medical Center and a general surgery resident at Beth Israel Deaconess Medical Center in Massachusetts.

Like Dr. Janczewski, Dr. Romatoski was in her first year of surgical residency in 2020. One of the things she said she remembers most is the fear many cancer patients expressed to her and fellow healthcare providers in moments of candor: Were they on the same floor as COVID patients? Has anyone around them been in contact with COVID patients?

"Cancer patients are already immunocompromised, so to add COVID on top of that, everybody was just so scared," she said. "Looking at the patients, it was very difficult to realize that you didn't know how to help them. A lot of patients died alone. It was very, very sad."

For the next phase of her research, Dr. Romatoski aims to investigate how the pandemic impacted cancer diagnoses in the years after 2020 and if the drops seen in predicted versus observed diagnoses were sustained.

"If we're anticipating that we may see higher stages of disease, how do we combat that and serve our patients the best?" she asked. "I still think it's important to look back at COVID and put the data in context as more come out. The data are going to be very instrumental in predicting as much as we can into the future about what we're going to see so that we can better prepare for it, train for it, and be ready to give patients optimal care."

"Something like this could also happen again," she added, "so I think it's important to study those stresses within the healthcare system to adapt and make changes for future events."

Cancer care team members are invited to come together and discuss the current state of cancer care at the ACS Cancer Conference in Austin, Texas, February 22–24: *facs.org/cancerconference.*

**Sheila Lai** *is the Senior Public Information Specialist in the ACS Division of Integrated Communications in Chicago, Illinois.*

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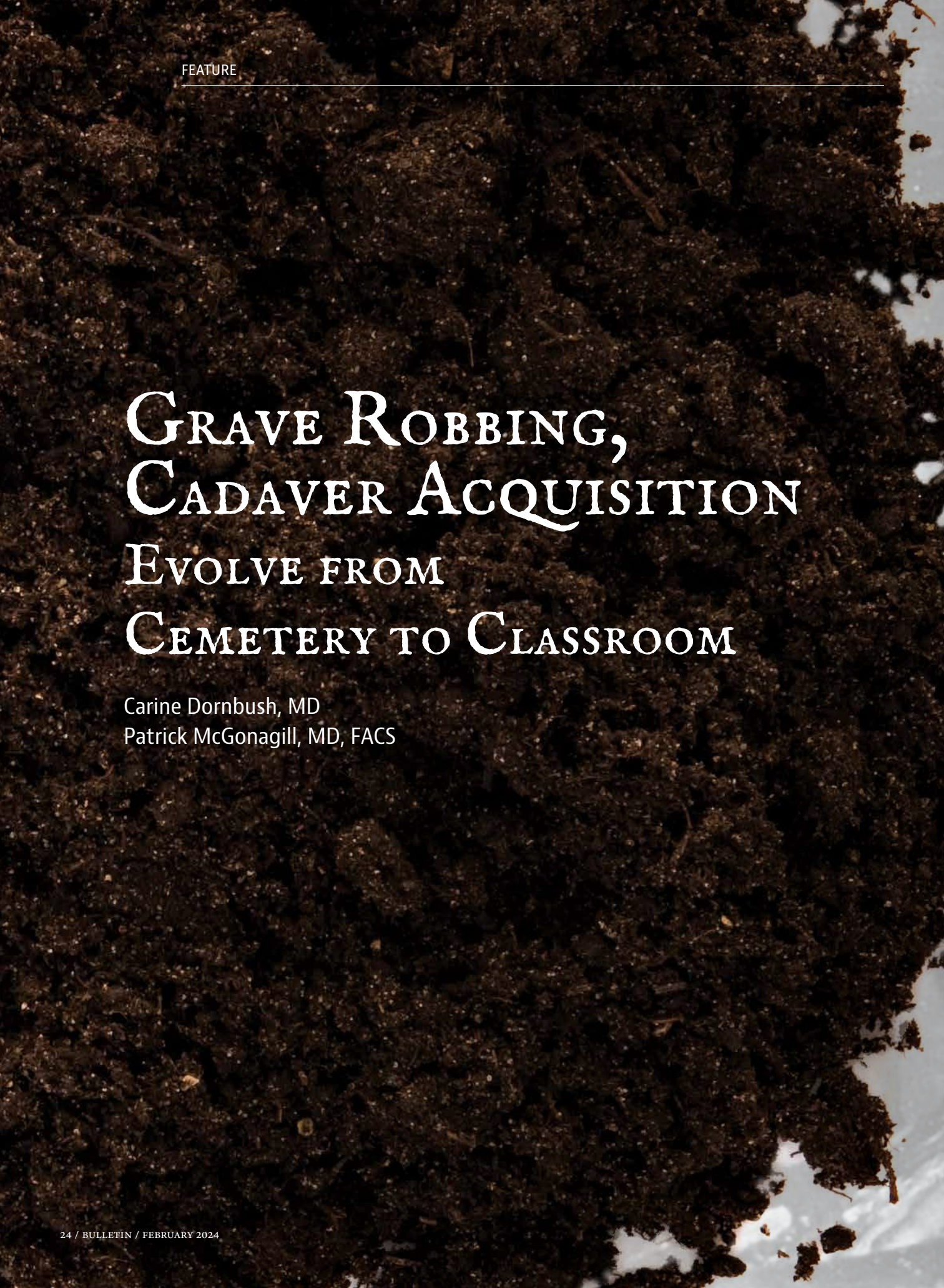
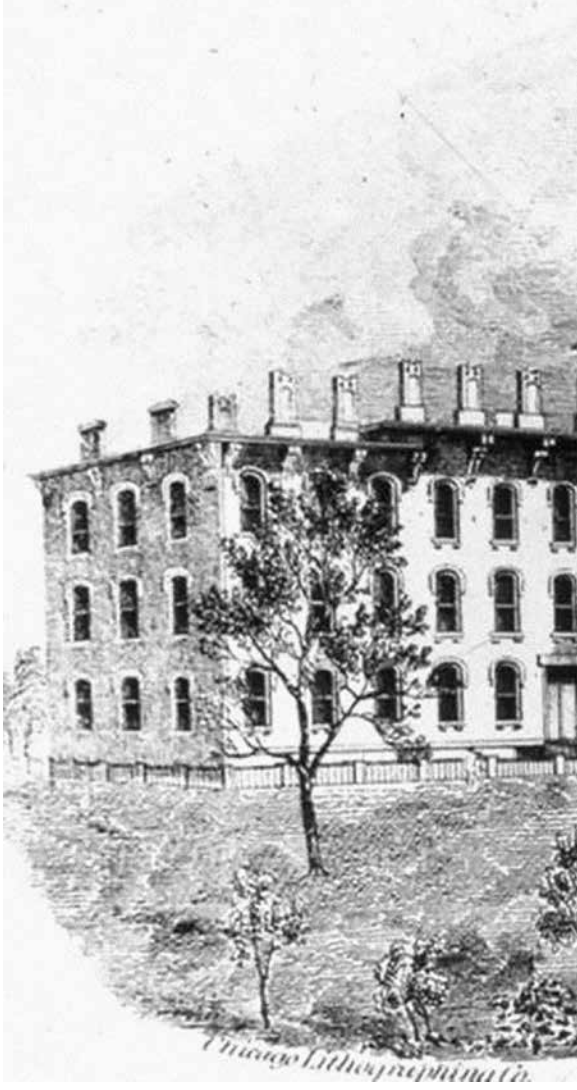


# Grave Robbing, Cadaver Acquisition

## Evolve from Cemetery to Classroom

Carine Dornbush, MD
Patrick McGonagill, MD, FACS

Editor's note: This article is based on the first-place winning entry in the 2023 History of Surgery Poster Competition, which occurred in conjunction with Clinical Congress.



HISTORICALLY, SURGEONS were often misunderstood or even feared for their close knowledge of anatomy. Society in the Middle Ages would not place any importance on the corporal form because of its transience when compared to the immortal spirit.

The Renaissance period would lead to advances in art, culture, medicine, and science. However, despite this age of scientific awakening, it was the barber-surgeons who dissected cadavers while the physicians and their students, widely considered social and professional superiors, observed from a distance. Nevertheless, from this tradition arose the legacy work of Andreas Vesalius: *De Humani Corporis Fabrica* (Of the Structure of the Human Body), published in 1555.[1]

From the mid-1500s to the modern era, the anatomist would alternate from social deviant to valued scientist. In fact, laws in Britain and Massachusetts in the US sentenced offenders to dissection following capital punishment as an attempt to deter crime.[2]

Later, in the 19th century, medical curriculum changed to embrace a more methodical rather than dogmatic approach to treatment of disease. This perspective brought a greater focus on anatomical dissection, increasing the demand for cadavers.[1,2] Capitalistic markets emerged to supply this need. Incentivized by monetary gain, bodies were raised from the grave and, in more extreme cases, brought to the grave.

The flourishing grave robbing industry needed to be stopped. The issue became especially urgent when high-profile individuals could not be guaranteed their final resting place. Notably, in 1878, after Senator John Scott Harrison of Ohio died (son of US president William Henry Harrison), witnesses saw his body being taken into a dissecting room as the Harrison family was searching for the body of a family friend believed to have suffered the same fate at the Ohio Medical College.[2] Finding a president's son on an anatomist's table quickly led to legislation to prevent resurrectionists from taking bodies from their graves in Indiana and Ohio.[2]

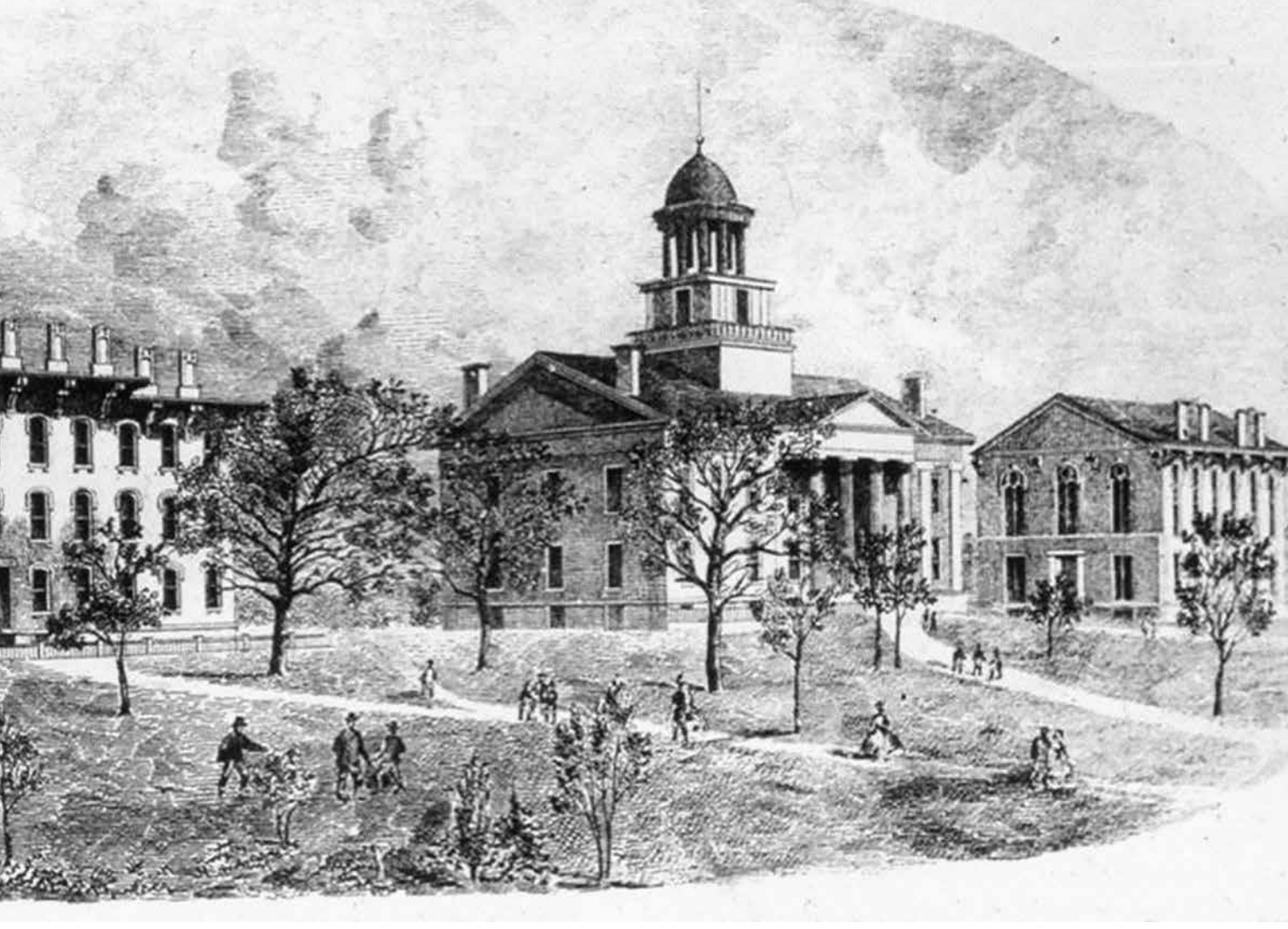
More heinous were the actions of Hare and Burke who murdered 16 people at their lodging house, earning approximately £7 apiece in Scotland and leading to legislative action. The law's response was to destroy the market in each case by supplying the anatomist with the corpses of the unclaimed.[2]

Uniform adoption of laws was not achieved in the US at a federal level. As Manifest Destiny (the divine right to expand westward) led to growth in the US, new states were admitted that would establish new medical schools, frequently featuring dissection within their curricula.[1,2] This reality re-established the demand for the trafficking in dead bodies, whether by legal or more sinister means.

The Medical Department at the University of Iowa in Iowa City enrolled its inaugural class in the fall of 1870.[3] The fees paid by those first 37 students were

Overleaf:
Medical students attend a course on dissection at the Medical Department of the University of Iowa (1898).

The historical photographs from the University of Iowa College of Medicine are courtesy of the University of Iowa Libraries, University of Iowa.



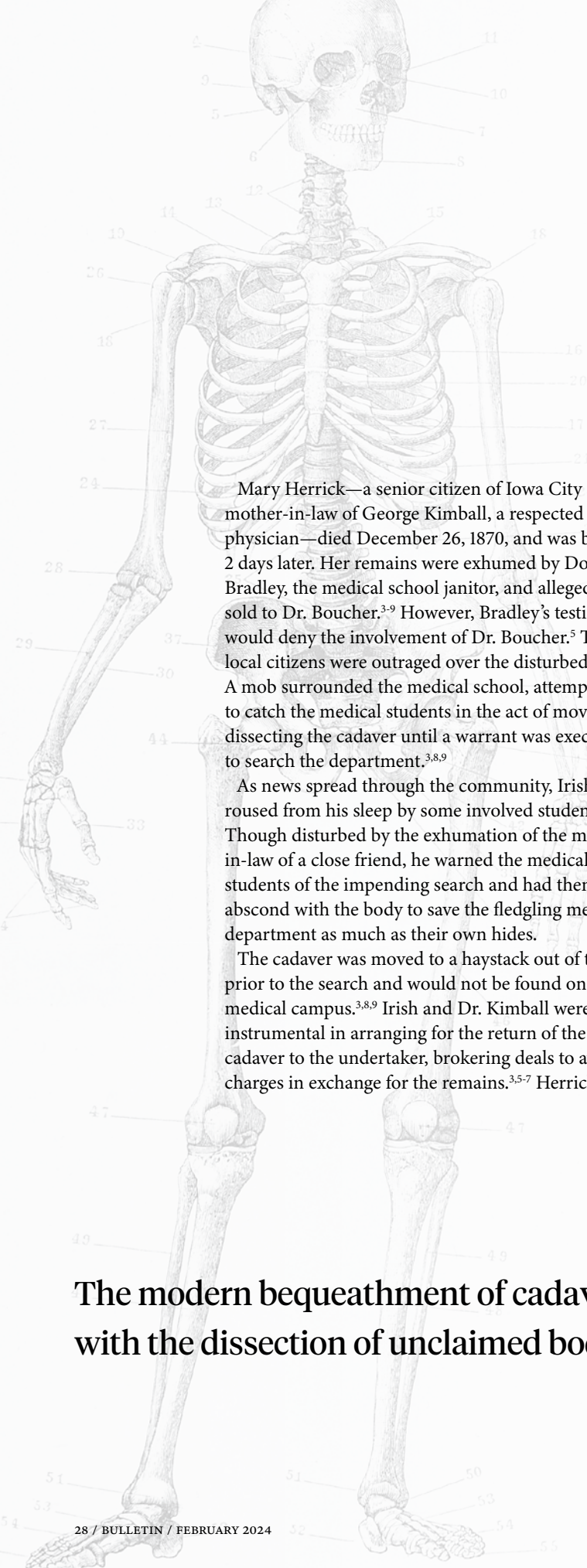
South Hall of the Medical Department at the University of Iowa provided a meeting place for students and faculty (1871).

directed into maintaining facilities and supplies. The school board refused to charge exorbitant fees, ensuring that lack of wealth would not drive students to false medical schools and denigrate the profession. However, this fee model meant the first faculty did not receive a salary from the school.[3]

The inaugural staff of the Medical Department included James H. Boucher, a Civil War brigade surgeon and colonel who was recommended by the likes of Generals William T. Sherman, Ulysses S. Grant, John A. Logan, and Don Carlos Buell, for the position of anatomy professor. Despite the more lauded and senior Dr. Boucher aspiring to the role, the position of professor of surgery and dean of the medical department would go to the much younger Washington F. Peck.[3]

The two had a tense relationship, not only over the matter of roles and experience, but particulars of practice. Dr. Boucher ascribed to new theories of antisepsis from Joseph Lister—a British surgeon and medical scientist who was the founder of antiseptic medicine and a pioneer in preventive medicine—while Dr. Peck did not, leading to further disagreements between the two clinicians. As an anecdote in the papers of John Thomas McClintock noted, Dr. Boucher would apply carbolic acid to the wounds of Dr. Peck's patients when he was looking away.[3,4]

To adhere to rigorous standards, the curriculum required anatomic dissection of cadavers. As John P. Irish, a member of the university governing board, local journalist, and Iowan politician, wrote, "…the surgeon must dissect the dead or mangle the living."[3] However, there were no laws in Iowa or the west regarding the possession of cadavers for dissection. All cadavers had to be obtained from out of state at costly sums of $25 to $30 each with no guarantees regarding the condition of the deceased in an era without refrigeration.[3] These circumstances presented a notable limitation to the medical school with its limited finances, particularly for the anatomy course. Therefore, the entrepreneurial spirit would compensate for this limited access to cadavers with unlawful exhumation.[1-3]



Mary Herrick—a senior citizen of Iowa City and mother-in-law of George Kimball, a respected local physician—died December 26, 1870, and was buried 2 days later. Her remains were exhumed by Dominick Bradley, the medical school janitor, and allegedly sold to Dr. Boucher.[3-9] However, Bradley's testimony would deny the involvement of Dr. Boucher.[5] The local citizens were outraged over the disturbed grave. A mob surrounded the medical school, attempting to catch the medical students in the act of moving or dissecting the cadaver until a warrant was executed to search the department.[3,8,9]

As news spread through the community, Irish was roused from his sleep by some involved students. Though disturbed by the exhumation of the mother-in-law of a close friend, he warned the medical students of the impending search and had them abscond with the body to save the fledgling medical department as much as their own hides.

The cadaver was moved to a haystack out of town prior to the search and would not be found on the medical campus.[3,8,9] Irish and Dr. Kimball were instrumental in arranging for the return of the cadaver to the undertaker, brokering deals to avoid charges in exchange for the remains.[3,5-7] Herrick's body was found and returned to the undertaker in an advanced stage of dissection with a mutilated face and red lead injected into the arterial system.[5,8,9]

Despite these deals, multiple members of the medical faculty and students were charged with disturbing the sepulcher of Herrick, and a grand jury was empaneled to investigate and collect evidence.[3,5,8,9] The testimony of the various faculty, students, and community members did not openly accuse Dr. Boucher of being involved in Herrick's exhumation. However, the verbose John North, who was the demonstrator of anatomy and responsible for the maintenance and acquisition of cadavers, described the presence of an unidentified, female cadaver in her sixties in the dissecting room. Dr. North also described an interaction with Bradley regarding this corpse. Bradley stated that the body belonged not to Dr. North but to Dr. Boucher. Dr. North also would imply, but not confirm, that the cadaver was Herrick.[8,9]

None of the accused were ultimately brought to trial as those who originally testified to the grand jury could no longer be found. This may reflect some backroom dealing as Irish resigned from the governing board of the university around this time

**The modern bequeathment of cadavers was still quite novel, with the dissection of unclaimed bodies occurring until 1968.**

Dr. James Boucher was head of anatomy and assistant surgeon as part of the first medical faculty at the University of Iowa.

and took political office.[3,4] Dr. Boucher, despite never standing trial, already had been tried in the court of public opinion. Dr. Peck took advantage of the circumstances to force Dr. Boucher to resign.[4]

The grave robbing incident of a respected citizen in Iowa City exposed the flaws in the process of obtaining cadavers. Drawn by the desire to preserve the sanctity of the grave and a commitment to providing adequate training to physicians, this event prompted important legislation in Iowa for the legal acquisition of unclaimed cadavers. However, the modern bequeathment of cadavers was still quite novel, with the dissection of unclaimed bodies occurring until 1968.[2]

## Legal Route to Obtain Cadavers

In 1872, Senate File (SF) 117: An Act to Promote the Science of Medicine and Surgery in the State of Iowa would pass. This legislation established a legal route to obtain cadavers for study. Cadavers would be delivered directly from the undertakers and coroners to the medical school for educational and scientific purposes.[10]

The stipulations in the law included that the decedent must be a resident of a community with a population greater than 1,000 for at least 6 months and exist without familial or personal requests to be interred without dissection. Families had 36 hours to claim the remains before delivery to the medical school but could claim the corpse after that date. Additionally, the cadavers had to be properly interred following the dissection. And perhaps most importantly, financial incentives were removed as no deals could be made to secure cadavers.[10]

This policy joined a plethora of laws worldwide that struggled to end grave robbing for dissection. SF 117 would be superseded by the Uniform Anatomy Gift Act in 1968, which allowed individuals to donate their bodies to science and education at the time of their demise, ending the practices of default dissection of unclaimed residents.[2] These laws marked a crucial shift in public opinion from dread related to their eventual desecration on the anatomist's table to a societal commitment to the anatomical training of physicians.[2]


**Resources**

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9. Testimony taken in the body stealing case: January 28, 1871-May 6, 1871. Johnson County District Court Records. R. Johnson Collection. Special Collections, State Historical Society of Iowa, Iowa City.
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# FOR SURGEONS, *Music* AUGMENTS RELAXATION, IMPROVISATION, AND FLOW

M. Sophia Newman, MPH

THE OVERLAP BETWEEN MEDICINE and musicality is long-standing and well-known. Doctors of all types have excelled at playing musical instruments. For example, famed physician and Nobel Peace Prize winner Albert Schweitzer, MD (1875–1965), worked as a professional organist before attending medical school.[1] Theodor Billroth, MD (1829–1894), known as the father of modern abdominal surgery, was an amateur pianist and among the first to research scientific aspects of musicality.[2]

But what does a pervasive love of music mean for surgeons' work in the OR? What insights do surgeon-musicians have to offer those whose musical experience extends no farther than hitting play on a stereo? In this article, four surgeon-musicians—Claudius Conrad, MD, PhD, FACS, Jeffrey B. Matthews, MD, FACS, Daniel Shoskes, MD, MSc, FRCS(C), and Joseph A. Dearani, MD, FACS—share their insights.

## Relaxation from Cells to Fingertips

If anyone knows about music in the OR, it's Dr. Conrad. After training as a pianist at a conservatory in his native Munich, Germany, he completed both a doctorate in the philosophy of music and a medical degree. He focuses clinically on minimally invasive liver and pancreas cancer surgery in Boston, Massachusetts.

Dr. Conrad also maintains a robust research portfolio on "many domains related to music in clinical medicine," as he put it, briefly listing studies on the impact of music on patients undergoing surgery, the well-being of patients' relatives, surgical performance of surgeons with varying experience levels, and team dynamics in the OR.

This comprehensive overview gives Dr. Conrad insight into what surgeons may gain through integrating music. In conversation, those findings flow together with observations from his many years of playing music.

His study[3] examined the molecular means by which music may impact the human stress response: "What we found was an interesting inverse correlation between growth hormone and interleukin 6. Growth hormone at that time was considered to be a stress hormone, and it was later found that cells of inflammation have growth hormone receptors on the surface, so that when growth hormone binds with interleukin 6, it is less secreted. So, when you listen to music, your brain will secrete growth hormone that then binds with cells of inflammation, and interleukin 6 is less secreted. That's the pathway."

Opposite page: Clockwise from top left: Drs. Claudius Conrad, Daniel Shoskes, Joseph Dearani, Jeffrey Matthews

The same general finding—more music, less stress—has consistently shown up in the results of his studies and in his own life and work. As a part of a team attempting challenging and sometimes wholly new surgeries, Dr. Conrad sometimes finds himself needing methods to cope with tremendous stress. "I want to do the best for my patients. So, I not only employ some of the mental mechanisms that I learned to deal with the anxiety of being on stage, but I try to practice the piano more," he said. "There's no question that even at this stage of being a relatively senior surgeon, the more I practice the piano, the more relaxed I am. I will use the weekend to practice more to be ready on Monday for a big surgery."

He also said that practicing sensitizes his fingers to feedback from the patient's tissues during surgery, explaining the hyperawareness is simply about being relaxed enough to focus on this sensory input, "The more relaxed you are, the entire body leading up to your fingers, the better you will be as a pianist and the better you will be as a surgeon."

## Improvising on Stage or in the OR

For Daniel Shoskes, MD, MSc, FRCS(C), the connection between music and surgery is less molecular and more metaphorical.

A kidney transplant surgeon by training, Dr. Shoskes transitioned to surgical practice in urology at the Cleveland Clinic in Ohio, and more recently took a position as vice-president of global medical affairs at Pacific Edge Diagnostics, a company focused on bladder cancer diagnostics.

Dr. Shoskes played music in his youth, set it aside while becoming established as a surgeon, and then returned to it. This involved a shift from the cello and guitar of his earlier years to the lute, a stringed instrument with a short neck and a rounded back that was once played worldwide. Since his early 40s, he has played "music from the Renaissance to the Baroque," a period from the 13th to the 18th centuries.

"I've been professional adjacent, in that I have performed with some professional orchestras," as well as creating four albums, consulting on films, and offering prodigious output via his YouTube channel, Dr. Shoskes said.

For him, improvisation is a key to both music and surgery. "I would have to say that the musical event most similar to a complex surgery is playing *continuo*, which is primarily in Baroque music, when you're accompanying a singer or an opera or in the orchestra," he said, further explaining that only a single bass line and some indications of harmony are planned, with all other elements improvised live by the musicians.

The result is total commitment. "You're constantly listening. The singer may do a particular ornament, and then you might imitate that over the bass line that you're playing, or the singer may jump to the third verse instead of the second verse, and you have to adjust to that. So, you're simultaneously controlling both your hands and reading the music and listening to multiple other musicians and responding to them," an experience that occupies the mind and body so fully in the present that everything else simply falls away.

The same feeling arises during a complex surgery, particularly "when you know something does not go as planned," he said. "That's when you slow your breathing and really become focused. I would say that those skills, when things go wrong in music, that's like when things are tense in the operating room. That is probably the skill that is most complementary to surgery."

Dr. Dearani, director of pediatric and adult congenital heart surgery at the Mayo Clinic in Rochester, Minnesota, is a saxophonist, trained in part at the New England Conservatory of Music. He currently plays in a jazz combo called TakeTwo & Friends[4] and a charity-focused band of pediatric cardiology clinicians called the Baby Blue Sound Collective,[5] as well as maintaining daily music practice that aids in work-life balance and stress management. "I play 4:30 to 5:30 in the morning before I come to work. During the pandemic…I felt like music, to some degree, saved me a little bit."

He discussed the relationship between musical improvisation and surgery in a 2021 article in *The Journal of Thoracic and Cardiovascular Surgery*.[6] Dr. Dearani wrote that in jazz improvisation as with a Baroque continuo, elements such as harmony are nonnegotiable and the musician has autonomy to otherwise interpret and embellish the score. "This requires intense acuity in communication," through each musician listening and responding to the notes the other musicians play.[6]

When players are skilled, excellence can result. "Great jazz performances occur when whole-system thinking is embraced by everyone involved," including "cross-functional relationships, real-time sharing of firsthand knowledge, highly attuned skills of listening, and in-the-moment design thinking."[6]

He posited that the same elements may apply to cardiothoracic surgery. Some procedures (e.g., valve replacement) are highly predictable, with little need and few opportunities for modification. Others, such as corrections for Ebstein anomaly, are far more variable. For these operations to succeed, the surgical team must have skills similar to those required for

jazz improvisations: the basic surgical plan—a factor analogous to the nonnegotiable harmony of a song—plus solid technical skills, good communication and teamwork, awareness of each patient's unique anatomy and pathology, and readiness for all potential mid-procedure changes.

## Finding Flow

While others revamp their musical skills for surgical purposes, Dr. Matthews, a Harvard-educated surgeon with a practice focused on the pancreas, uses music itself to aid his work in the OR. For 17 years, he has been the chair of surgery and Dallas B. Phemister Distinguished Service Professor of Surgery at The University of Chicago in Illinois.

Alongside his thriving career, Dr. Matthews is a self-described "drooling fanatic" for rock music. His background includes learning to play guitar as a teenager, becoming a punk rocker and radio disc jockey at Harvard in his undergraduate years, and transitioning into a blues and jazz fan later in life. As Dr. Shoskes did (and many other musically inclined surgeons do), he set music aside for years as his career advanced. "When I was in my 40s, I kind of decided, with the encouragement of my wife and kids, to get more seriously back into it again," he said.

Gradually, he moved from intensive practice to writing his own songs, finally landing at recording albums with a team he described as a Grammy-winning producer, a drummer formerly employed by Paul McCartney, a guitarist who toured with David Bowie and played on John Lennon's *Double Fantasy,* and other rockers with similarly illustrious CVs. The songs they record together are available on Spotify and elsewhere. "I don't have any illusions about the talent level I bring to the table," Dr. Matthews humbly noted, "but it's a lot of fun to do."

While he is impressed with the resumes of his musician colleagues, he said, they are impressed with his surgical achievements. And the connections between music and surgery don't stop at mutual respect. For Dr. Matthews, music is important in the OR—where the purpose involves targeting attention. "Music helps with my flow," he said.

Flow in the psychological sense is a term first defined by psychologist Mihaly Csikszentmihalyi, PhD. It is an intense state of concentration in which a person becomes so fully devoted to the task at hand that self-consciousness, awareness of time, and even a focus on one's own physical needs temporarily vanish. The original impulse to study the phenomenon arose, Dr. Csikszentmihalyi once said, when he realized that artists, including musicians,

## TIPS FOR GETTING BEST RESULTS FROM *Music* IN THE OR

### KEEP THE VOLUME MODERATE

Both too loud and too soft music has been shown to increase stress.

### SKIP THE LYRICS

Although it is not universal, many people say instrumental music allows for better concentration.

### AIM FOR A MODERATE BEAT FREQUENCY

In various studies, faster music has had some association with slightly faster procedures; however, those same tunes may prove a more powerful distraction than moderately paced music, offsetting any benefit.

### NO SINGLE GENRE IS BEST, BUT CLASSICAL MUSIC MIGHT COME CLOSEST

Because classical music is moderate in intensity with an intellectual rather than emotional pull, it may be a good option for maximizing surgical outcomes.

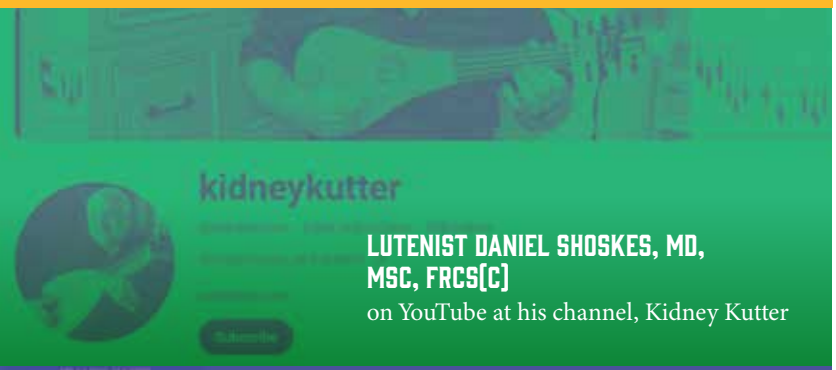
### CONSIDER YOUR TEAM

Asking what works for your colleagues in the OR may help to forge a high-functioning team.

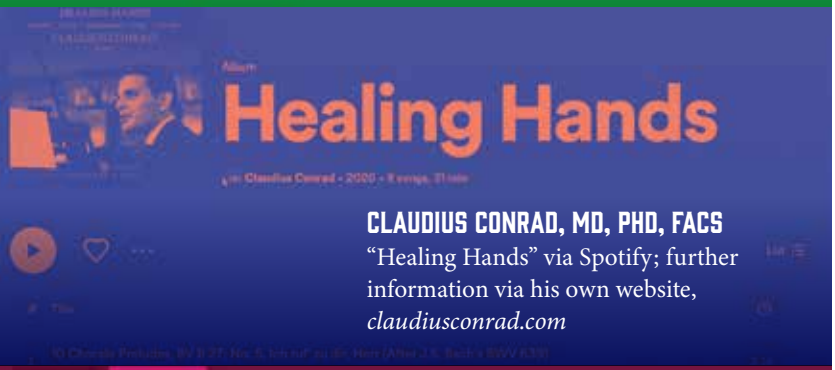
### TURN IT OFF WHEN THE SITUATION DEMANDS ATTENTION

Multiple interviewees noted that shutting off music when needed reinforces close attention to the patient's needs.

## WHERE TO ACCESS THE MUSIC OF SURGEON-MUSICIANS

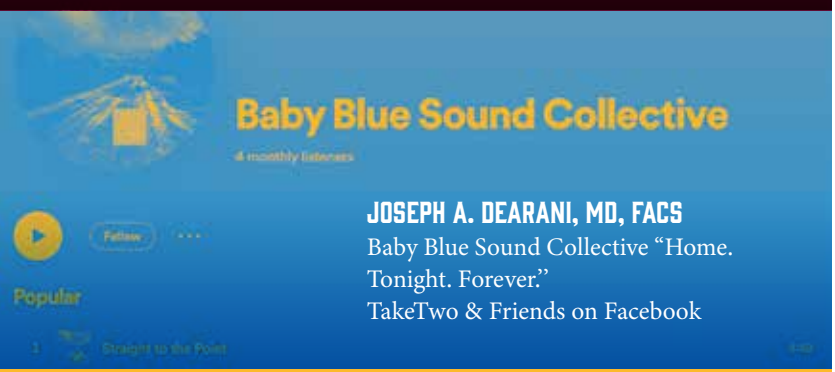



**LUTENIST DANIEL SHOSKES, MD, MSC, FRCS(C)**
on YouTube at his channel, Kidney Kutter




**CLAUDIUS CONRAD, MD, PHD, FACS**
"Healing Hands" via Spotify; further information via his own website, *claudiusconrad.com*


**JEFFREY B. MATTHEWS, MD, FACS**
"Temper of the Times" EP via Spotify




**JOSEPH A. DEARANI, MD, FACS**
Baby Blue Sound Collective "Home. Tonight. Forever."
TakeTwo & Friends on Facebook

**FIND THE LINKS IN THE ONLINE ARTICLE**

often had the experience of becoming totally lost in their work.[7]

A mental state not fully under personal control, flow occurs when the amount of information a person receives is at or near, but not over, their maximum capacity. Through his research, Dr. Csikszentmihalyi eventually pinpointed this at 110 bits of information per second (in comparison, understanding a conversation takes approximately 60 bits per second).[7]

The Yerkes-Dodson law,[8] first defined in 1908 by Robert Yerkes and John Dodson, captures an empirical relationship between physiological or psychological arousal and performance. To wit, increased stimulation improves performance up to a point, after which excessive arousal causes performance to decline. The key to sustaining a state of flow—and thereby maximizing performance—is to perfect the rate of input and the arousal it creates.

The goal of music in the OR, then, is to fine-tune arousal to the right level. In describing immersive operations as akin to an intensive experience of musical improvisation, Drs. Shoskes and Dearani are perhaps nodding to the concept of flow—in that case, flow achieved by maximal absorption in two different kinds of challenging situations.

For other, more routine operative experiences, Dr. Matthews described music itself as a topping-up of the information rate. He noted that it involved adding easily accommodated sound ("It's sort of about filling in the spaces in the atmosphere") and covering up extraneous noises ("I find it really distracting to hear people's conversations around me. So, for me, having the music on allows that to go away").

### The Best Way to Play Music in the OR

Dr. Matthews's approach is common; most surgeons, including Drs. Conrad and Shoskes, listen to music in the OR. Dr. Dearani noted that music can reduce tension in the surgical theater: "This feeling that making the room completely silent translates into people being more focused—I'm not sure that's the case. That's not the case for me, I know."

But Dr. Matthews's experience hints that the choice of songs playing in the surgical theater often needs to be precise. Getting it right is no small matter; all the interviewees, as well as the

literature on music in surgery,[9] agree that there is no guarantee music will aid an operation.

It is a finding that Dr. Conrad could verify through his own research. "I would say you should think about the role of music in the operating room like a drug. There are positive effects, but there can be side effects, and you have to be very strategic in the dosing of your music," he said.

That includes the volume, which should be neither blasting loud nor whisper quiet; beat frequency, which should be slow to moderate; and shifts in tone and emotional intensity, which should be limited.

Dosage does not necessarily dictate genre, however. Here, tastes can vary. In the OR, Dr. Matthews tends to prefer the genre he plays himself, rock. Dr. Dearani said he has kept the same carefully curated mix of songs by James Taylor, Carole King, and Stan Getz for 25 years. Meanwhile, Dr. Conrad has examined the question of which genre of music is best and strongly favors classical music. As a result, he has created an entire album, *Healing Hands,* tailored for use in the OR and freely available online.

When referring to the lute music he plays, Dr. Shoskes noted, "My music is good background music," but specified this was true for "only the people who have no connection with the music I perform," an audience that of course excludes himself. Knowing the nuances of Renaissance and Baroque music means he taps into the music's emotional depths, an experience too complex to handle mid-surgery.

"Pop music doesn't engage me emotionally and intellectually the way this other stuff does," he said, and this means the procedure itself can be his central focus. In the OR, where flow and the need to improvise can be essential, the only "best" music may be the kind that achieves this exact result.

## A Long History

Whatever one's involvement with music, it is clearly inextricable from the lives of many surgeons.

Indeed, surgeons' inquiries into music in surgery go nearly as far back as surgery itself. In addition to the 19th-century inquiries of Dr. Billroth, a 1914 *JAMA* article, "Phonograph in Operating-Room,"[10] raised the option of playing music "for calming and distracting patients."

That early modern work added to a tradition already more than a millennium old. The medically trained Turco-Persian philosopher Al-Farabi (who, like Dr. Shoskes, played the lute), considered music a form of therapy in his treatise *Meaning of the Intellect*, written around AD 925, and compared learning music to learning medicine in his *Kitab al-Musiqa al-Kabir (Grand Book on Music).*[1]

The centrality of music to human lives is unlikely to abate, too. Dr. Matthews said his lifelong love of music has "deep, deep psychological roots," a statement less particular to him than a description of nearly all of humanity.[11]

Music can be uniquely powerful for humans—whether surgeons or anyone else. Dr. Conrad mused, "People go to a concert and have this ecstatic or out-of-body experience that people rarely have from looking at a painting or listening to poetry. And what is it from? It's nothing. It's nothing we ingest. It's just molecules in space that change their frequency. This is unbelievable, right?" B

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Access related video content online.

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# Xenotransplantation Bridges Past and Present, Revolutionizes Field of Transplantation

Brendan P. Lovasik, MD
Joshua M. Rosenblum, MD, PHD, FACS
Jahnavi K. Srinivasan, MD, FACS
David Vega, MD, FACS

The Greek myth Daedalus and Icarus is one of the first recorded instances of xenotransplantation.

THE PROSPECT OF CLINICAL XENOTRANSPLANTATION recently has been invigorated by two pioneering cardiac xenotransplant cases performed at the University of Maryland in 2022 and 2023.

However, there are several renowned surgeons who embarked upon early attempts at cardiac xenotransplantation, including James D. Hardy, MD (1964), Donald Ross, MD, FACS (1967), Denton A. Cooley, MD, FACS (1968), and Leonard Lee Bailey, MD (1984), who performed the first infant heart transplant on "Baby Fae" at Loma Linda University Medical Center in California—a case that captured news headlines around the world.

This historical retrospective traces the history of cardiac xenotransplantation and the controversies associated with previous attempts at human trials, while providing insight into new opportunities for this revolutionary and potentially lifesaving therapy.

## From Ancient Greece to the 20th Century

Xenotransplantation, from the Greek "xénos" (foreign, guest, strange), refers to the transplantation of tissues across species barriers. The first successful clinical xenotransplant in ancient legend was performed by Daedalus, who grafted bird feathers onto his arms to escape by flight from Crete to Athens. The first xenograft failure was noted in Daedalus's son Icarus, who developed hyperacute graft rejection due to a thermolabile reaction.[1]

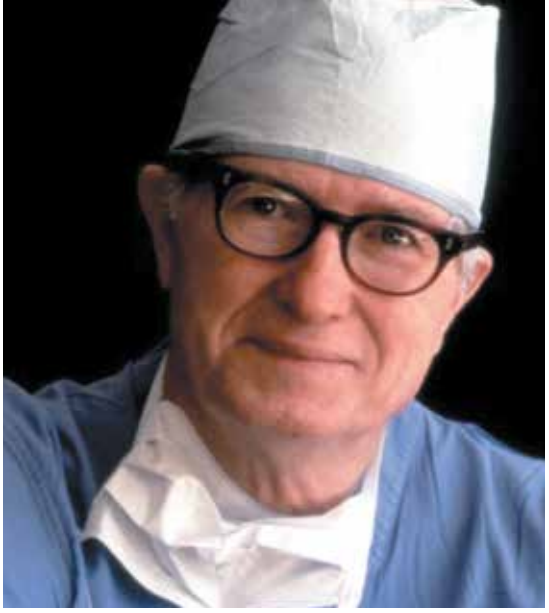
Later attempts at clinical xenotransplantation began in the early 20th century, when advances in the understanding of physiology led to new interest in renal xenografts. In 1906, Mathieu Jaboulay, a professor of clinical surgery in Lyon, France, attempted two heterotopic renal xenografts from a sheep and goat; both grafts failed due to hyperacute rejection with vascular thrombosis.

In 1910, Ernst Unger, a German physician and surgeon, performed a renal xenotransplant from a nonhuman primate to human, which similarly failed after 32 hours due to vascular thrombosis.[1] In 1923, Harold Neuhof, a pioneer of thoracic surgery, performed a renal sheep-to-human xenotransplant at Mt. Sinai Hospital in New York City. This xenograft survived for 9 days and represented a leap forward in xenograft survival.

Dr. Neuhof later wrote: "[This case] proves, however, that a heterografted kidney in a human being does not necessarily become gangrenous and the procedure is, therefore, not necessarily a dangerous one, as had been supposed. It also demonstrates that thrombosis or hemorrhage at the anastomosis is not inevitable. I believe that this case report should turn attention anew."[2] Dr. Neuhof was a founding member of the American Board of Surgery in 1937.

The next attempts at renal xenotransplantation followed the development of renal replacement therapy by hemodialysis in the 1940s and 50s. While hemodialysis treatment showed exciting promise at sustaining life, the relative shortage of dialysis machines led to new innovations in renal replacement. In 1964, Keith Reemtsma, MD, a surgeon at Tulane University in New Orleans, Louisiana, published reports of 13 chimpanzee-to-human xenotransplants. While most grafts survived 4-to-6 weeks, one of these xenografts survived for more than 9 months and allowed its recipient to return to activities of daily life, including work as a schoolteacher.[3]

Also in 1964, Thomas E. Starzl, MD, PhD, FACS, published a report of six baboon-to-human renal xenotransplants with varying success, as well as heterotopic auxiliary liver xenografts.[4,5] Dr. Starzl would pioneer human liver transplantation in 1967, and later the use of cyclosporine and tacrolimus.



Top left:
The first cardiac xenograft was performed by Dr. James Hardy in 1964.

Top right:
Dr. James Hardy

## From First to Fae (1964–1984)

*"We should solve the problem [of organ transplantation] by using heterografts [xenografts] one day if we try hard enough, and maybe in less than 15 years."*

*—Sir Peter Medawar, Nobel Prize-winning immunologist, 1969*[1]

The first human heart transplant was a xenotransplant using a chimpanzee heart performed on 68-year-old Boyd Rush on January 23, 1964, by Dr. Hardy at the University of Mississippi in Jackson. After completing his medical education at the University of Pennsylvania in Philadelphia in 1942, Dr. Hardy was later recruited to become the inaugural chair of surgery at the University of Mississippi in 1955. There, he focused the department's efforts on organ transplantation. This was a reasonably attainable goal, as this area was still an emerging field and the new department could readily compete with more established surgical departments. He also was able to use expertise from Dr. Reemtsma's transplant laboratory in nearby New Orleans.

Just a few days before the xenotransplant, Rush experienced a presumed myocardial infarction and was transferred to the University of Mississippi. Over the subsequent days, Rush developed progressive cardiac failure.

At the time, Dr. Hardy was considering performing a human-to-human heart transplant, using the heart of a neurologically devastated trauma patient who was in Mississippi's intensive care unit, but the potential donor's heart was still beating (in an era before clinical brain death).

Rush developed fulminant cardiac failure on the night of January 23 and was taken emergently to the OR for cardiopulmonary bypass as salvage therapy. Rush's sister signed an informed consent form that stated "any heart transplant would represent the initial transplant in man," though it did not state the heart to be used was from a nonhuman primate. The orthotopic chimpanzee heart functioned for 60-90 minutes following transplant, but Rush was unable to be weaned from bypass and died.

The University of Mississippi's director of public information released a guarded statement on the priority of this first human heart transplant that included the vague phrase "the dimensions of the only available donor heart" and did not disclose that the donor heart came from a chimpanzee. The Associated Press widely distributed a story that began with, "Surgeons took the heart from a dead man, revived it, and transplanted it into the chest of a man dying of heart failure today," failing to recognize the use of a nonhuman primate as the donor. Dr. Hardy would publish this case report in *The Journal of the American Medical Association* (*JAMA*) later that same year.[6]

Dr. Hardy's career as a pioneering cardiothoracic transplant surgeon is remarkable, as he also performed the first human lung transplant in 1963, using a human donor. Dr. Hardy served as the served as the 1980-1981 ACS President.

In 1968, Dr. Ross performed a heterotopic pig-to-human cardiac xenotransplant at the National Heart Hospital in London. This xenograft survived less than 5 minutes due to hyperacute rejection. Dr. Ross is best known for developing the pulmonary valve autograft to replace a failing aortic valve in 1967, now known as the eponymous Ross procedure, as well as performing the UK's first human cardiac allotransplant in 1968.

Also in 1968, Dr. Cooley performed an orthotopic sheep-to-human cardiac xenotransplant at the Texas Heart Institute in Houston.[7] This xenograft also survived only a few minutes due to hyperacute rejection.

Dr. Cooley is perhaps the most famous American cardiac surgeon to date, with a long list of accolades and "firsts" in cardiac surgery. As a resident, he assisted Alfred Blalock, MD, FACS, in his first

subclavian-pulmonary arterial shunt in 1944 (now the eponymous Blalock-Thomas-Taussig shunt). He founded the Texas Heart Institute in 1962 and was the first to implant a total artificial heart in 1969.

In 1977, Christiaan Barnard, a surgeon in South Africa, performed two clinical xenotransplant procedures using hearts from nonhuman primates at the University of Cape Town.[8] These procedures were unique, as they were heterotopic xenotransplants that were used as a ventricular-support bridge to supplement circulation in two patients who were unable to be weaned from cardiopulmonary bypass. The two xenografts were taken from a chimpanzee and baboon, which functioned for 5 hours and 4 days, respectively. Dr. Barnard is best known for performing the first successful human cardiac allotransplant in 1967.

The next attempt at cardiac xenotransplantation would not come for several years. In 1984, Dr. Bailey performed a baboon-to-human orthotopic heart transplant into an infant at Loma Linda Medical Center. The patient, Stephanie Fae Beauclair, was born prematurely with hypoplastic left heart syndrome.

At the time, there had never been an attempt at heart transplantation of any kind in an infant. Intended as a bridge to allotransplant, "Baby Fae" underwent this procedure on October 26, 1984, at 12 days old due to progressive instability and fulminant cardiac failure with her native heart.

The xenotransplant was performed using cyclosporine immunosuppression across an ABO-incompatible immune barrier using an AB-type baboon donor into the O-type recipient (as the O blood type is nonexistent in baboons).

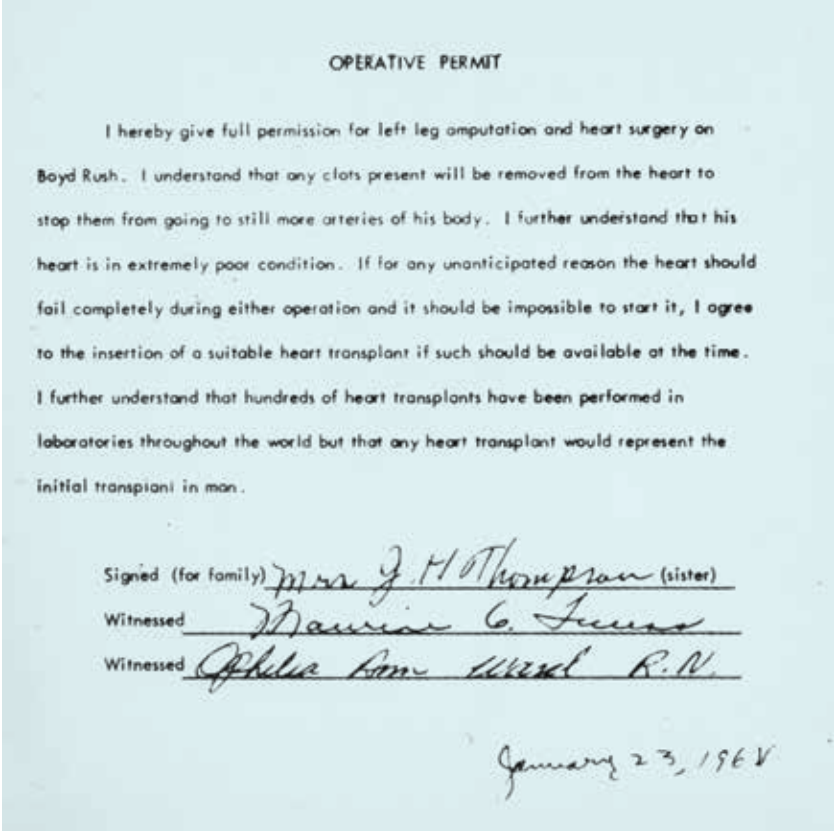
This procedure and its potential for success captivated the nation, even making the cover of *Time* magazine in an article "Baby Fae Stuns the World."[9] Baby Fae lived for 20 days post-transplant before dying from complications of acute graft rejection.

The *Time* article revealed some of the sharp divisions regarding xenotransplantation within the surgical community. In the article, John Najarian, MD—chair of surgery at the University of Minnesota and pioneer in the use of antithymocyte globulin for use in transplantation—remarked: "There has never been a successful cross-species transplantation. To try it now is merely to prolong the dying process. I think Baby Fae is going to reject her heart."[9]

John J. Collins Jr., MD, chief of the Division of Cardiac Surgery from 1970 to 1987 at Brigham and Women's Hospital in Boston, Massachusetts,

Top left to right:
Drs. Donald Ross, Denton Cooley, and Christiaan Barnard

Bottom:
The informed consent form for patient Boyd Rush—who received the first cardiac xenotransplantation—did not state that the heart to be used was from a chimpanzee.



OPERATIVE PERMIT

I hereby give full permission for left leg amputation and heart surgery on Boyd Rush. I understand that any clots present will be removed from the heart to stop them from going to still more arteries of his body. I further understand that his heart is in extremely poor condition. If for any unanticipated reason the heart should fail completely during either operation and it should be impossible to start it, I agree to the insertion of a suitable heart transplant if such should be available at the time. I further understand that hundreds of heart transplants have been performed in laboratories throughout the world but that any heart transplant would represent the initial transplant in man.

Signed (for family) Mrs J. H. Thompson (sister)

Witnessed Maurice G. Jones

Witnessed Ophelia Ann Ward R.N.

January 23, 1968

Top left:
Two historic xenotransplants of genetically modified pig hearts were performed by UM School of Medicine faculty at the UM Medical Center.

Top right:
Stephanie Fae Beauclair, also known as Baby Fae, was the recipient of a baboon cardiac xenotransplant performed by Dr. Leonard Bailey.

said: "It's easy to sit back and be negative when a new treatment is announced. If we all were afraid to attempt the untried, we would have no new treatments."[9] The transplant also sparked new questions regarding the ethics of laboratory animals used for medical research.

Thirteen months after the transplant, *JAMA* published three articles on the Baby Fae xenotransplant. The first was a detailed scientific paper authored by Dr. Bailey "describing the first case of cardiac xenotransplantation in a neonate."[10] The second article, "Informed Consent and Baby Fae," noted "there has been great public concern about the ethical problems involved in the highly experimental surgery" and ethics of parents deciding experimental cures for their children. The third was an editorial and medical review, which concluded that the transplantation was doomed to fail and that hopes for a successful transplant by Dr. Bailey were "wishful thinking."

Despite the controversies surrounding Baby Fae's transplant, Dr. Bailey persisted and would perform the first human cardiac allotransplant in an infant the following year.

## Modern Cardiac Xenotransplant and the "Holy Grail"

*Xenotransplantation "is just around the corner, but it may be a very long corner."*

*—Sir Roy Calne, organ transplantation pioneer, 1995*[1]

Following the Baby Fae xenograft, it would be nearly 40 years before the next attempt at clinical xenotransplantation. On January 7, 2022, Bartley P. Griffith, MD, FACS, and colleagues at the University of Maryland (UM) in Baltimore, performed a life-sustaining orthotopic pig-to-human cardiac xenotransplant into a 57-year-old man using a genetically modified pig donor and novel immunosuppression medications.[11-13] This graft sustained function for 60 days before failing due to diffuse endothelial injury and immune activation.[14] Dr. Griffith and his team then performed a second orthotopic cardiac xenotransplant into a 58-year-old man on September 20, 2023, using a similar protocol. The second transplant functioned for 40 days until it failed due to xenograft rejection.[15] Both xenotransplant recipients were unable to receive clinically available advanced heart failure therapies due to other comorbidities.

Several preclinical breakthroughs have paved the way for the use of xenografts in clinical application. Novel immunosuppressive medications developed to target the costimulation pathway CD40-CD40L have been established in preclinical studies to be superior to clinically available immunosuppression agents like tacrolimus.

Advances in genetic engineering have allowed modification of the porcine donor using transcription activator—like effector nucleases and somatic cell transfer using CRISPR/Cas9 to prevent xenograft rejection. This genetically modified pig included deletion of porcine-specific cell-surface carbohydrates (alpha-1,3-Gal, Beta-4-Gal, and Neu5Gc), deletion of intrinsic growth factor (GHR) and the addition of several human genes that modulate complement regulation (CD46, CD55), anticoagulation (EPCR, thrombomodulin), and innate anti-inflammatory (CD47, HO-1) signaling.[12] Along with improvements in cardiac intensive care and extracorporeal circulatory support to mitigate perioperative early heart dysfunction, these new innovations have re-invigorated the interest in cardiac xenotransplantation.

## Cardiac Xenotransplant: Ready for Primetime?

*"Xenotransplantation is the future of transplantation, and always will be."*

*—Norman E. Shumway, MD, PhD, a cardiac surgeon who performed first heart transplant in US*[1]

Several preclinical breakthroughs have paved the way for the use of xenografts in clinical application.

Several barriers still exist before xenotransplantation can be considered a clinically available therapy for patients with end-stage heart failure. Overcoming the remaining immunologic, physiologic, infectious, social, ethical, and regulatory hurdles to xenotransplantation while ensuring foremost patient safety and patient outcomes remains paramount.[7]

Lingering questions include the optimal organ for xenotransplantation trials, recipient functional status, xeno donor, and immunosuppressive regimen to best support the patient post-transplantation. Looking further into the future, advances in tissue engineering and biomechanical engineering may allow for a more tolerogenic or even autologous synthetic organ.

The history of cardiac xenotransplantation is rich with immunologic and technical innovations, as well as courageous patients and compassionate surgeons. Many of the preeminent cardiac surgeons, including Drs. Hardy, Ross, Barnard, Bailey, and Griffith, have built upon years of knowledge and study to pioneer this revolutionary therapy to improve patient care.

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Listen to a recent episode of *The House of Surgery* podcast series featuring Dr. Griffith and his John H. Gibbon Jr. Lecture from ACS Clinical Congress 2023, "What's New May Be Old: Xenotransplantation."

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Dr. Leah Backhus

Dr. Mara Antonoff

# Women Build Bonds and Break Ceilings to Redefine Leadership in Cardiothoracic Surgery

Leah M. Backhus, MD, MPH, FACS
Mara B. Antonoff, MD, FACS

One might ask the question, why examine leadership through the lens of gender? As with many aspects of career development, gender plays a significant role both inwardly and outwardly. It shapes how we relate to others and how they relate to us. It also is a social construct that is deeply rooted in history.

When we examine the field of medicine, and surgery more specifically, the data show that women are woefully outnumbered—and this disparity is multiplied several-fold when the leadership ranks are examined. Historically, women have been systematically and deliberately excluded from medicine and surgery, giving rise to our underrepresentation. Thankfully, systematic exclusion is no longer the threat it once was, but change is slow.

Pipeline efforts to increase women entering the surgical field have been successful, but currently the majority are clustered at the junior level of training and seniority. Unconscious bias and remnants of exclusionary practice persist at the higher ranks, creating a dearth of women leaders.

It seems like circular logic, but one way of increasing representation of those underrepresented in an exclusive group is to have more underrepresented members in positions of influence, specifically in leadership roles. And knowing that we have more women in the queue for leadership positions, we need to be deliberate about how they are prepared to lead. In doing so, we take a hard look at the requisite skillset of female surgical leaders and capitalize on strengths to increase our chances of success.

International leaders in general thoracic surgery, including Drs. Leah Backhus and Mara Antonoff, attended the 2022 World Conference on Lung Cancer in Vienna, Austria.

## Qualities of Inspiring (Women) Surgeon-Leaders

One of the first women surgeons was Miranda Stuart, a British army medical officer who dressed and presented herself as a man, using the name of James Barry to gain acceptance in her specialty. Dr. Stuart spent 56 years as "Dr. Barry" and developed a reputation as "bombastic, opinionated, and tactless." Despite these traits, Dr. Stuart/Barry was perceived as a very skilled military surgeon.[1]

We certainly are not advocating the adage of "act like a man" as a route to leadership in surgery. In fact, if these traits had been exhibited by women surgeons, even today, the perception of their abilities would likely be very different. Rather, there are several leadership qualities—such as empathy, resilience, strong communication, humility, and emotional intelligence—that, while not exclusive to women leaders, are exhibited more often among successful women in these roles. We should be aware of these attributes as we aim to amplify the positives and minimize the negatives. The playing field is anything but equal, and failing to recognize some of the differences can thwart the ascent of even the most brilliant surgeon-leader.

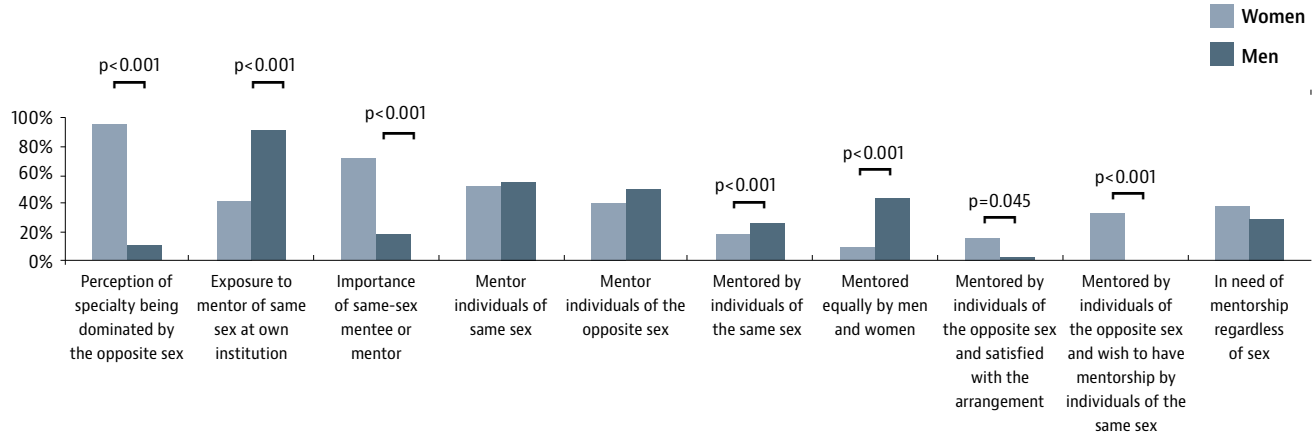
Several leadership styles have been attributed to different professional sectors. In a survey among 20 women surgical chairs in the US, two leadership styles are predominate: servant and transformational leadership.[2] Servant leadership is the dominant style that emphasizes a collaborative team with shared goals and consensus building. This style of leadership builds camaraderie, often resulting in a happier and more harmonious work environment where people are more likely to flourish than flounder.

Transformational leadership is defined by inspiration and rooted in tailored mentoring that motivates individuals to strive for more. This style involves leading with a carrot rather than a stick and seeks to promote and elevate individuals, which in turn, elevates the collective team. Having a mixture of leadership styles is helpful because it allows for tailoring incentives to motivate team members.

The approach by which a leadership style is successfully implemented depends on communication, and productive communication begins with listening. Good listening skills facilitate dialogue and intellectual discourse. Great women leaders often are effective communicators, using their skills of observation to distill complex situations down to basic components.

In addition, women leaders often display empathy—which can be one of the most important skills of any leader. Strong communication skills also are critical for managing conflict and resolving difficult interpersonal problems. Having a nonconfrontational communication style can disarm would-be opponents and create a clearer path to conflict resolution. Women, too, can be excellent at

**Figure.**
**Surgeon Mentorship Needs:**
Respondents in Surgical Specialties



Dr. Leah Backhus is a surgeon-leader at Stanford Medicine and VA Palo Alto Health Care.

multitasking and masterful at balancing multiple competing agendas.

One of the most powerful traits that women surgeon-leaders possess is resilience. While a woman surgeon's creativity and skill are key to her success as a clinician, it is her resilience that is her greatest strength and has allowed her to excel and advance in her profession despite the odds working against her. Through resiliency, she has adapted, persevered, and pivoted, all while maintaining forward momentum.

## Challenges Faced, Victories Achieved

While women surgeons are growing in number and continuing to shatter glass ceilings by taking on new positions of leadership within the specialty, ample challenges still remain.

On our own career journeys, we have experienced plenty of bumps in the road, and, undoubtedly, these circumstances have shaped our pathways. In the end, such obstacles ultimately have enabled new strategies for growth and opportunities for subsequent victory.

It's been shown that women in surgical specialties are more likely to desire same-gender mentorship, yet are far less likely to find it in their home institutions compared to male surgeons, as well as compared to women in nonsurgical specialties (see Figure, page 44).[3] This reality is even more extreme in surgical specialties that tend to be more male-dominated.[4] However, while this circumstance can be daunting, we have found that in the absence of women mentors in our immediate reach, efforts to broaden our networks nationally, and even globally, to women and supportive male sponsors have only strengthened our leadership trajectories. By cultivating collaborative, supportive relationships and networks, we have experienced greater opportunities for involvement and recognition.

While striving to develop academic surgical careers, we have faced challenges—to which many women can relate—centering around our roles as mothers.[5] As one aims to reach certain career milestones and landmarks, there is a very complex balance in the interplay between jumping on opportunities while trying not to "lean out" as related to family planning.[6]

Even after navigating these issues, it's inevitable that time can be lost regarding career progression during childbearing and parenting. Nonetheless, the skills, perspective, joy, and balance that we have gained from our roles as mothers have genuinely made us better doctors, stronger surgeons, and more versatile leaders.

Perhaps counterintuitively, women who choose not to marry and/or have children can face a different set of biases that can impact their leadership opportunities. Some may interpret the lack of a partner or children as antithetical to being female, and thus their absence can be viewed as a deficit or mark of inadequacy. So, for many women surgeons, they may feel you're damned if you do and damned if you don't.

A number of potential barriers have been identified for subgroups of individuals aiming to climb the academic surgery ladder, ranging from work-life balance, to personal medical conditions, toxic hierarchies, financial disadvantage, and the lack of diversity contributing to noninclusive environments and discrimination on the basis of gender, race/ethnicity, religion, sexual orientation, and country of origin.[7,8] These challenges can be addressed by anticipating them, carefully planning navigational strategies, and putting a heavy lean on support networks and mentors. The best leaders learn to be aware of others' barriers in the academic surgical arena.

Certainly, we have encountered many other challenges on our pathways, such as the disparate opportunities for sponsorship, the pervasive presence of implicit (and explicit) biases, and inequities in recognition for achievements and contributions. However, seeking solutions, establishing collaborative support networks, and working toward systematic change for others in the future have all had great impact on our own leadership journeys—enabling us to gain resilience and lead change.

## Strategies for Leading and Encouraging the Next Generation

In order to move the field of surgery and all of our subspecialties into the future, it is imperative that our workforces far better reflect the communities of patients whom we aim to serve. Women currently make up half of all medical student bodies in the US, yet women continue to be a minority in leadership roles in the field. Disparities in progress occur at every stage of the career pathway, beginning at attrition during training, matriculation into advanced specialty training, and climbing ladders of leadership in academia and community practice. Surgical subspecialties, such as cardiothoracic surgery, have lagged even further behind general surgery in shifts toward a more diverse workforce.[9,10]

To encourage and support the future generations of women in surgery, there are a number of key steps that should be taken by current surgeon-leaders.

**Be a role model.**

We often hear that you can't be what you can't see. For trainees and early careerists, visibility and access to women leaders in surgery are pivotal. Access to representative role models can help draw young, talented trainees from a wide range of backgrounds and experiences into surgery and its subspecialties. Don't be afraid to be approachable and be very public. Have a strong social media presence and be a known entity to the young and inexperienced.

On this day, Dr. Mara Antonoff worked with an all-women team in clinic at MD Anderson Cancer Center.

Almost by definition, any of us who is currently within the House of Surgery in whatever capacity has someone who is trailing behind them and looking for inspiration. Even if you have no desire to be a role model, you are in a position of influence—so use that opportunity for good.

**Be a mentor and sponsor.**

Mentors are critical to career development, and the presence of strong mentorship has been recognized as one of the most important factors in determining career success. Effective mentoring relationships can drive mentees' goals to fruition by providing support, so that opportunistic risk can be taken, and failures can be translated into learning experiences.

Mentoring can play a critical role in diversifying the surgical workforce. Mentors should allocate time and effort, provide research and training opportunities, offer constructive feedback, and support networking by direct sponsorship or linking to sponsors. Beyond these activities, outstanding mentors can help provide a vision with purposeful, individualized tailoring. They exhibit admirable traits worth emulating, while also respecting privacy, wellness, and work-life balance.

**Change the stigma.**

We all know that biases are held about women in surgery by colleagues, patients, caregivers, and the public. But there also are false narratives perpetuated by women themselves regarding what a career in surgery looks like, the role that a surgeon-mom holds in the lives of her children, and the potential satisfaction that women can have in the surgical world.

As surgeon-leaders, women and men need to work to explicitly show young women that they are wanted, needed, and able to make a significant difference in the world through their careers in surgery—and, even more, that they can live fulfilling lives while doing so.

**Encourage change.**

It is undeniable that current women leaders in surgery fought some very tough battles and climbed huge hills that may no longer be present. We must work to ensure that things are better for the generations of women surgeons who follow us, just as parents work to try to allow their children opportunities to achieve more than the previous generations of family members.

There is nothing to be gained by pushing for other women to have the same struggles that have existed

for those in the past and present. If we can make things just a little bit easier, that does not mean future women surgeons will be weaker or that the bar will be lower, but rather that they will have greater opportunities to reach their true potential. There is no place in surgical culture for someone who climbs the ladder and pulls it up behind them. For women who already have climbed the ranks of surgical hierarchy, this is a chance to lead change for the future.

**Offer skills training.**
Leadership is innate to some, but for many of us, it is a learned skill. Recognize the unique skills required to do it well, and arm those who are ascending into new positions with the proper tools to do the job. These actions require more than providing new titles or allocating resources. This type of support means providing training opportunities to help cultivate the requisite leadership skillset.

Many more training opportunities are available now than in the past. There are external programs available through the ACS and many other organizations, in addition to local programs. These resources should be mandatory (along with coaching) for those taking on new leadership roles. They also are critical for those who are identified as future leaders, so they can be prepared for the opportunities when they arise. In essence, you have to stay ready, so you don't have to get ready.

## Future of Women in Surgeon Leadership

Within the future of surgical leadership, we aspire for a day when women are equitably represented in surgery, its subspecialties, and all echelons of leadership. Yet, even with more balanced representation, aspects of gender still may permeate the experience of women striving for leadership growth.

To ensure ongoing success of women in the field and opportunities to reach their full potential, a number of goals are necessary in order to modify the current culture and infrastructure of the surgical profession, such as providing clear pathways and programs to bring women into leadership and offering equitable opportunities for all, with inclusive support of mentors and sponsors.

In the end, we must alter our expectations of what a leader should look like, what she should do, and how she should behave. We strive for a day when women are leading other women and men, with support from men (and other women).

With deliberate effort and conscious steps to reach these ends, women may ultimately lead our specialty to a new era of growth, in the end achieving more favorable workplace environments, greater job satisfaction, and equitable career development opportunities for members of our specialty at large with a downstream positive impact on the patients being treated by a more diverse workforce. B

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

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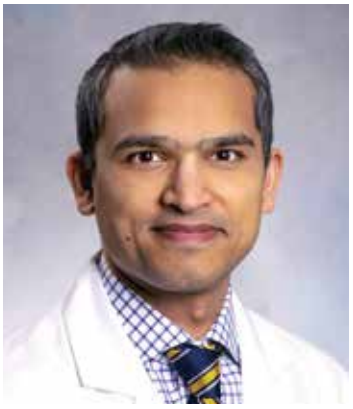
Isita Tripathi

Vanitha Raguveer



Dr. Nakul Raykar

# “Blood Deserts” Face the Burden of Global Blood Deficits

Isita Tripathi
Vanitha Raguveer
Nakul Raykar, MD, MPH

Reliable access to blood is crucial for the provision of safe, affordable, and timely surgical care. However, critical shortages in the availability of blood and its components lead to millions of preventable deaths each year.[1] Hemorrhage is responsible for approximately one-fourth of maternal deaths globally and up to 40% of deaths among trauma patients who reach the hospital.[2]

Kakuma is a rural town that is part of a blood desert in Kenya. (Credit: Franco Sacchi)

RECENT MODELING studies suggest that almost 2,000 units of blood per 100,000 people are needed to meet current demands. With severe shortages of blood existing in every country in sub-Saharan Africa, south Asia and Oceania, global transfusion needs outcompete the available blood supply.[3]

In these low- and middle-income countries (LMICs) that face blood shortages, the overall mortality index from hemorrhage is significantly increased compared to high-income nations.[1] Rural communities bear the brunt of global blood shortages, effectively becoming "blood deserts," where the closest blood bank may be hours away. Without adequate availability of blood products, providers in LMICs are often required to defer lifesaving operations due to the high probability of a patient dying on the table.[4]

## What Is a Blood Desert?

A blood desert is a geographic area where there is no timely and affordable access to blood components in more than 75% of cases in which transfusions are necessary.[5] Blood deserts persist due to myriad factors ranging from geography to blood banking infrastructure and national policies.[2]

With the majority of blood banks located in urban areas, distribution of rural blood banks tends to be sparse. Access to blood banks in rural settings is further limited by treacherous terrain and unreliable road infrastructure.[1,2] Pervasive mistrust and limited education around blood donation create additional scarcity, evidenced by a six-fold lower rate of blood donations in LMICs.[6]

Moreover, traditional blood banking is both expensive and logistically complex, requiring integration across collection, testing, and delivery of blood products. These requirements are often inconsistent with the reality in LMICs, where a dearth of trained providers is operating under an insufficient budget with limited laboratory resources and storage space.

## Why Is Access to Blood a Surgeon's Problem?

According to surgeons who work in the world's lowest resource areas, access to blood is one of the most pressing issues facing patients, families, and providers in their communities. Take, for example, a referral hospital located in a blood desert in Kenya, where a patient from a road traffic accident arrives with severe fractures and unstable vital signs. The surgeon calls for blood, but the blood bank has no matching, screened blood available for transfusion.

Now the surgeon faces a dilemma. Does the surgeon operate knowing that the patient is likely to die without blood? Or is the patient referred to another hospital knowing that the individual may not survive the transfer? Should the surgeon wait to see if another unit of blood becomes available?

Despite the physician's best efforts, the question of transfusion is the one that determines the answer to life or death. The doctor chooses to send the patient to a nearby hospital, hoping that he survives the journey and that the next hospital has blood. Unfortunately, like most hospitals in the region, it does not.

These types of stories emerge repeatedly in conversations with rural surgeons in LMICs. As we look toward ensuring safe, reliable access to transfusion, we must center the needs of communities living in these blood deserts where blood scarcity has life-threatening consequences.

## Current Strategies Are Filling the Gaps

Creative solutions in recent years have employed innovative technologies to target resource-specific challenges in the global blood deficit. Damu Sasa, a digital platform in Kenya, enables real-time access to blood product inventory, allowing neighboring hospitals to promptly address regional shortages.[7]

Walking blood banks, a strategy historically used in military settings, offer a solution to delivery and storage challenges through mobilizing a pre-screened pool of donors.[8] Aerial drones also are being explored to reduce costs and delivery time, particularly in areas with limited infrastructure.[9] Surgeons also are developing low-cost methods for intraoperative autotransfusion, in which the patient's own blood is collected and reinfused, which has proven to be a safe and

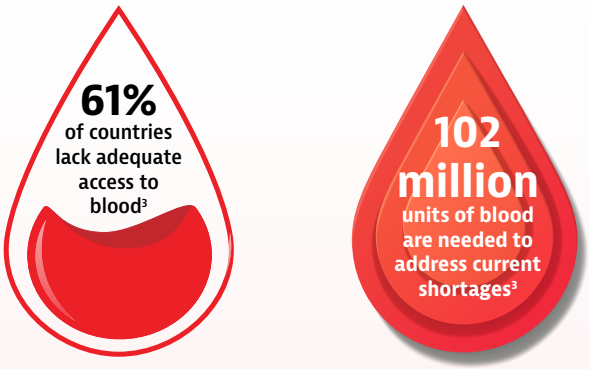
established technique.[10]

The successful and sustainable implementation of these innovative solutions requires a community-centered approach. Capacity assessments are critical to understanding each blood desert's unique challenges, discovering community perspectives, and identifying strengths that can help address the blood shortage. Community-implemented research like the BLOODSAFE Program—a National Heart, Lung, and Blood Institute-led blood safety and availability program in sub-Saharan Africa—has demonstrated enhanced access to blood transfusion, emphasizing that community engagement is the cornerstone of successful blood banking.[11]

While these novel initiatives underscore the urgency and determination to overcome barriers to blood transfusion, they must be accompanied by significant advocacy efforts for increased finances and infrastructure dedicated to improving blood banking systems. The Blood Delivery with Emerging Strategies for Emergency Remote Transfusion (DESERT) Coalition, a group led by clinicians, researchers, policymakers, and industry experts, is one example of a cross-disciplinary movement to implement research and policy initiatives in this area.[5]

Blood tests are performed at the Lodwar County Referral Hospital in Kenya. (Credit: Franco Sacchi)

# The Global Blood Crisis




The overall mortality index from hemorrhage is significantly increased in low- and middle-income nations.[2]

A blood desert is a geographic area where there is no timely and affordable access to blood components in more than 75% of cases in which transfusions are necessary.[5]

## Safe, Effective Solutions

→ Interhospital inventory communication
→ Walking blood banks
→ Intraoperative autotransfusion
→ Community engagement programs
→ Aerial drones

### Call to Action

Blood products are a required component of lifesaving medical and surgical interventions, yet critical shortages and limited access affect countless communities across the globe. Inadequate distribution of blood banks, insufficient infrastructure, and incohesive policies have facilitated the creation of blood deserts in rural regions across LMICs that face life-threatening lack of access to blood stores.

Surgeons on the front lines confront these challenges every day. The surgical community must come together to support our colleagues in blood deserts and generate momentum across local communities, healthcare systems, and governments.

Safe, accessible solutions that have been implemented and tested across settings—such as walking blood banks, intraoperative autotransfusion, and drone-based delivery of blood products—already exist. The technology is not only available, but in the case of walking blood banks and intraoperative transfusion, it also is affordable.

Surgeons must take the next step, whether through advocacy in high-resource settings or direct action in blood deserts.

- *Examine* the current need and resources in your communities.
- *Implement* available solutions.
- *Train* personnel and standardize protocols.

- *Advocate* for local and national governments to devote attention to blood deserts and reduce regulatory barriers to implementation of existing technologies.
- *Stay informed* about ongoing efforts of the Blood DESERT Coalition.

Community-based, innovative solutions have laid the path forward to transform blood deserts into lifesaving oases.

Surgeons, the safety of these communities now lies in your capable hands.

**Disclaimer**

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

**Isita Tripathi** *and* **Vanitha Raguveer** *are medical students working with the Systems for Trauma and Blood (STAB) Lab at the Program in Global Surgery and Social Change at Harvard Medical School in Boston, MA. The STAB Lab, led by* **Dr. Nakul Raykar**, *associate trauma surgeon at Brigham and Women's Hospital in Boston, focuses on applying innovative solutions to the global blood crisis and strengthening surgical systems in low-resource settings.*

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Dr. Jacob Moalem

# Visionary Gift Supports UR Chief Residents' Attendance at Clinical Congress

Jacob Moalem, MD, FACS

## It is said that there is no greater gift than the gift of education.

THIS SENTIMENT CLEARLY RESONATES with James L. Peacock, MD, FACS, a retired surgical oncologist, master educator, and philanthropist who has taken this concept one step further. After dedicating his entire career to the education of students and residents at the University of Rochester (UR) in New York, he now has ensured they have the opportunity to attend the ACS Clinical Congress in perpetuity. He has endowed a visionary gift fund to support every UR chief resident's attendance at the meeting. According to Dr. Peacock, providing this fund has been an annual highlight of his illustrious career. In fact, he credits attending Clinical Congress with much of his own professional development, love of surgery, and the maintenance of lifelong friendships.

Following his surgical residency at Vanderbilt University Medical Center in Nashville, Tennessee, and a surgical oncology fellowship at the National Cancer Institute, Dr. Peacock was recruited to the University of Rochester by the late Seymour I. Schwartz, MD, FACS, whom he first met in 1988 at the ACS Clinical Congress in Chicago, Illinois.

Dr. Peacock remained at UR for his entire career, during which he was honored with seven teaching awards and served as program director of the general surgery residency program for 8 years. Since his retirement from clinical practice, he has remained an integral contributor to the education and quality assurance programs at UR and continues to attend Clinical Congress regularly.

Of the numerous influences over his storied career, among the most formative has been his membership and participation in the ACS. In particular, many of the important conversations of his career took place at Clinical Congress, including an initial meeting with Dr. Schwartz, who went on to serve as the ACS President in 1997. Clinical Congress was the vehicle through which many of the relationships which he most valued were built or strengthened. Dr. Peacock estimates that he has attended nearly 40 Clinical Congresses since 1984.

Upon his retirement, Dr. Peacock felt compelled

Dr. James Peacock (second from right) inspires chief residents such as (from left) Katherine Rosen, MD, Kaci Schiavone, MD, and Andreas Giannakou, MD.

> "Dr. Peacock's gift will forever be appreciated as it was an opportunity to see the true impact of academic medicine."
>
> —Dr. Kaci Schiavone

to ensure that all future residents at his beloved UR program would enjoy similar exposure to the educational and networking opportunities that he cherishes. The idea germinated at a UR dinner held during a Clinical Congress meeting shortly after his retirement, when he and his wife, Lisa, were particularly moved by the camaraderie and reflections of medical students and residents in attendance. At the dinner, they came up with the idea to endow a fund supporting the attendance of UR chief residents at Clinical Congress.

Predictably, the response from residents and colleagues has been glowing. "Attending Clinical Congress was an excellent networking opportunity to meet past faculty and graduates, surgeons from across town, and colleagues of current faculty members. I was able to experience firsthand just how vast the University of Rochester's reach is. Dr. Peacock's gift will forever be appreciated as it was an opportunity to see the true impact of academic medicine and see our co-residents present their hard work on a national stage," said Kaci Schiavone, MD, who graduated from UR in 2023.

David C. Linehan, MD, FACS, the Seymour I. Schwartz Chairman of the UR Department of Surgery, commented: "I am most grateful to Jim and Lisa Peacock for their generous endowment gift that will support our residents in perpetuity. I see no better way to honor Jim's decades-long legacy as a master educator at the University of Rochester."

Like many of the ACS Fellows, Dr. Peacock greatly values the College, its mission, and the lasting impact that fellowship has on one's career. His gift demonstrates the value he places on education, the high esteem in which he holds the ACS, and the importance of the annual Clinical Congress. His gift allows every surgical chief resident from UR the opportunity to experience the College at its finest.

If you have been inspired by Dr. Peacock's generosity and would like to similarly impress the value of continued education and the College on the next generation of Fellows, consider making a gift to the ACS Foundation. The creation of an endowment will ensure residents from your institution, across the country, or from around the world, can attend Clinical Congress and reap the same benefits that you have.

Establishing an endowment to benefit the ACS Foundation is one of the most powerful ways for your philanthropy to have a lasting impact. An endowment gift is given with the intention to preserve the original value of the gift and for it to grow over time. Funds are held in perpetuity and invested with the accumulated appreciation and income from the investment providing an annual distribution. The annual distribution is spent in accordance with the donor's wishes—in this case, resident education and career building through attendance at Clinical Congress.

For more information on creating an endowment or making a transformational gift to the ACS, contact the Foundation at 312-202-5338, or acsfoundation@facs.org.

Dr. James Peacock joins chief residents from the University of Rochester at a special event.

**Disclaimer**

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

**Dr. Jacob Moalem** *is an endocrine surgeon, professor of surgery and endocrinology, and director of quality and safety in the Department of Surgery at the University of Rochester in New York.*

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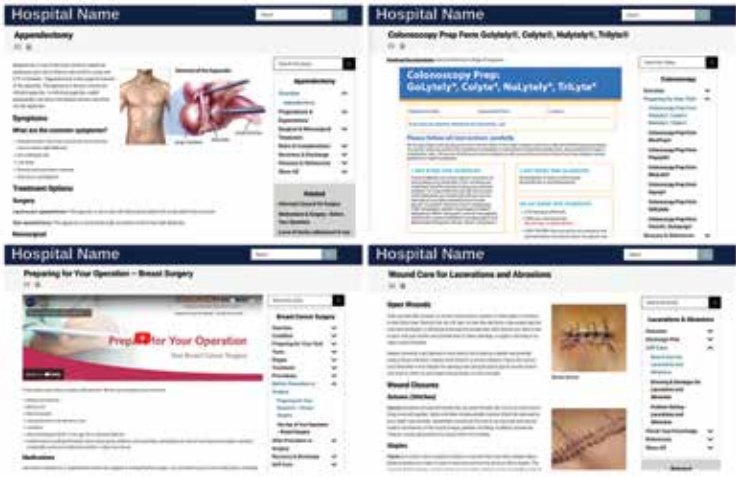
# ACS Toolkit Provides Must-Have Surgical Patient Education Content




THE DIGITAL ACS PATIENT Education Toolkit—featuring trusted, evidence-based, and easily accessible information from the ACS, National Cancer Institute (NCI), and National Institutes of Health (NIH)—is available for purchase. This customizable point-of-care surgical education resource is designed to help patients understand procedures, make informed decisions, and confidently manage their perioperative experience.

The Toolkit comes in two editions: Provider and Hospital. The Provider Toolkit includes patient education content for general, colorectal, pediatric, thoracic, and vascular surgery, while the Hospital Toolkit, designed for centers with multiple providers, currently is available for general surgery and breast cancer.

Upon enrolling, you will receive a unique website address that is personalized with your name and loaded with helpful information relevant to your surgical specialty. More than 200 resources within the Toolkit are available to display on your website or share with patients via text, email, or printed material.

All editions of the Toolkit feature ACS procedure brochures, surgical cancer training materials, and skill-based videos, as well as content from the NIH, NCI, and the National Heart, Lung, and Blood Institute. Customizable content also is available, and site usage data are monitored to provide insight on how the Toolkit is being used.

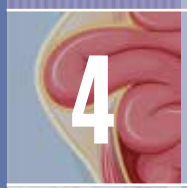
More information about the Toolkit and a 60-day free trial and/or paid subscription are available at *facs.org/my-patient-education-toolkit*. Contact surgicalpatienteducation@facs.org for details.

# Top 10 Most Read *Bulletin* Articles in 2023


Coming in 2023: Extensive Changes for Reporting Anterior Abdominal Hernia Repair

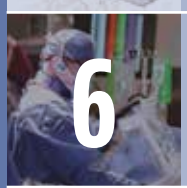

New 2023 CPT Coding Changes Impact General Surgery, Related Specialties


2023 Changes to Reporting Inpatient and Observation Evaluation and Management Services

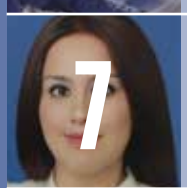



New Approaches, Trends Are Emerging in Hernia Repair


AI Is Poised to "Revolutionize" Surgery




Robotic Surgery Is Here to Stay—and So Are Surgeons



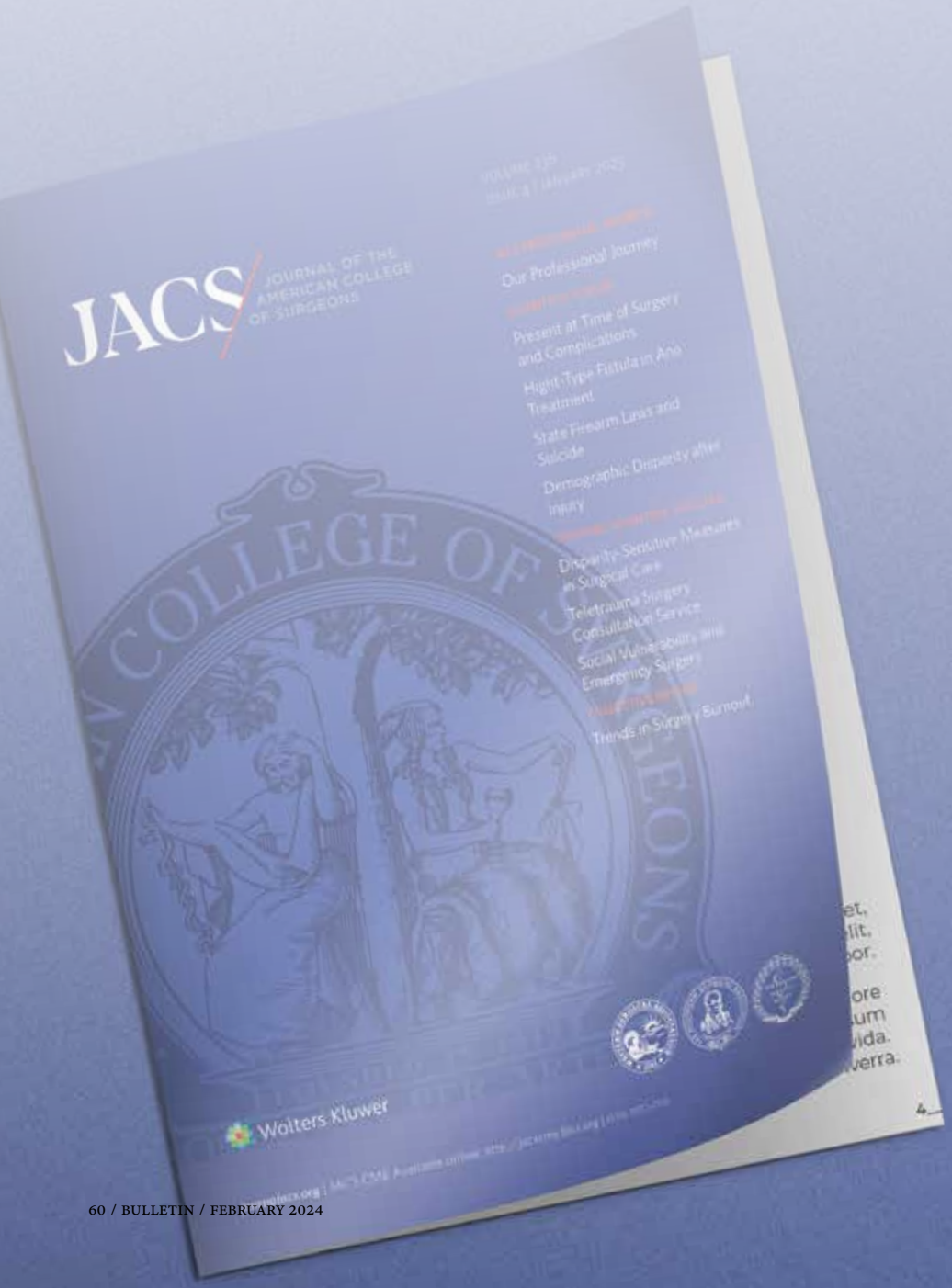

Ethical Concerns Grow as AI Takes on Greater Decision-Making Role


Whole Blood in Resuscitating Trauma Patients Is Making a Comeback


Delivering Difficult Patient Conversations Is a Skill to be Learned, Practiced


Evolving Approaches to Diverticulitis Give Surgeons a Gut Check in Management Options

# Top *JACS* Articles in 2023 Unveil Pulse of Surgical Progress




FROM PIONEERING procedures to groundbreaking research, the most read articles in the *Journal of the American College of Surgeons* (*JACS*) in 2023 resonated strongly with a community of surgeons dedicated to pushing the boundaries of medical science and improving patient outcomes.

*JACS* featured noteworthy articles—carefully curated and peer-reviewed—focused on cutting-edge techniques, novel approaches, and transformative discoveries such as lessons learned from war, staging laparoscopy for pancreatic cancer, shared decision-making, whole blood resuscitation, rescuing livers for transplantation, colonic and whole gut motility data, and more.

"We would like to thank all the authors who submitted articles to the *Journal of the American College of Surgeons,* as well as the editors who thoughtfully reviewed and selected the best articles. We strive to have the most impactful articles that will help the practicing surgeon—regardless of specialty. This group of articles is no exception," said Timothy J. Eberlein, MD, FACS, *JACS* Editor-in-Chief.

# Most Cited

Environmental Impact and Cost Savings of Operating Room Quality Improvement Initiatives: A Scoping Review

Proceedings from the Second Medical Summit on Firearm Injury Prevention, 2022: Creating a Sustainable Healthcare Coalition to Advance a Multidisciplinary Public Health Approach

Mass Shootings in America: Consensus Recommendations for Healthcare Response

Normothermic Machine Perfusion for Declined Livers: A Strategy to Rescue Marginal Livers for Transplantation

Development and Validation of an α-Fetoprotein Tumor Burden Score Model to Predict Postrecurrence Survival among Patients with Hepatocellular Carcinoma

# Most Read on *journalacs.org*

Putting Medical Boots on the Ground: Lessons from the War in Ukraine and Applications for Future Conflict with Near-Peer Adversaries

Yield of Staging Laparoscopy for Pancreatic Cancer in the Modern Era: Analysis of More than 1,000 Consecutive Patients

Whole Blood Resuscitation and Association with Survival in Injured Patients with an Elevated Probability of Mortality

Impact of Objective Colonic and Whole Gut Motility Data as Measured by Wireless Motility Capsule on Outcomes of Antireflux Surgery

Effectiveness of Single Chest Tube vs. Double Chest Tube Application Postdecortication: Prospective Randomized Controlled Study

# Top Altmetrics*

Proceedings from the Second Medical Summit on Firearm Injury Prevention, 2022: Creating a Sustainable Healthcare Coalition to Advance a Multidisciplinary Public Health Approach

Putting Medical Boots on the Ground: Lessons from the War in Ukraine and Applications for Future Conflict with Near-Peer Adversaries

Shared Decision-Making in General Surgery: Prospective Comparison of Telemedicine vs. In-Person Visits

Long-Term Survival Outcomes after Operative Management of Chronic Pancreatitis: Two Decades of Experience

Impact of Medicaid Expansion on Breast Cancer Diagnosis and Treatment in Southern States

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*Altmetrics, or alternative metrics, are measures that take into account online reader behavior, network interactions with content, and social media.

# Member News

## Odell Is Section Head of Thoracic Surgery

Dr. David Odell

David D. Odell, MD, MMSc, FACS, a general thoracic surgeon, joins the Department of Surgery at Michigan Medicine in Ann Arbor, as the section head of thoracic surgery, vice chair of quality and safety, and clinical instructor of thoracic surgery. Previously, he was associate professor of surgery at the Feinberg School of Medicine at Northwestern University in Chicago, Illinois.

## Gow Assumes Leadership Role at Stony Brook Medicine

Dr. Kenneth Gow

Kenneth W. Gow, MD, MHA, FACS, is the new chief of pediatric surgery in the Department of Surgery at Stony Brook Medicine in New York. Dr. Gow previously was at Seattle Children's Hospital in Washington, where he was a pediatric general and thoracic surgeon and co-medical director of the vascular access service. He also was professor of surgery at the University of Washington in Seattle.

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.

## Lund Is Made OBE Dame Commander

Dr. Valerie Lund

Valerie J. Lund, CBE, MB, FRCS, FRCSEd, who is an otolaryngologist, has been made a Dame Commander of the Order of the British Empire (OBE) for services to rhinology. Awarded by King Charles, the UK's 2024 New Year Honours List recognizes the achievements and service of extraordinary people across the country. Dr. Lund is an emeritus professor of rhinology at the Ear Institute of University College London, and in her career spanning more than 40 years, she has been an honorary consultant surgeon at the Royal National Throat, Nose, and Ear Hospital, Moorfields Eye Hospital, and University College Hospital, all in London. She has been an Honorary Fellow of the ACS since 2017.

## Hanna Is Chief at Thomas Jefferson

Dr. Nader Hanna

Nader N. Hanna, MD, FACS, is the chief of surgical oncology at Jefferson Health and a professor of surgery at Thomas Jefferson University in Philadelphia, Pennsylvania. Previously, he was the director of clinical operations in the Division of General and Oncologic Surgery and a professor of surgery at the University of Maryland School of Medicine in Baltimore. Dr. Hanna is Chair of the ACS International Relations Committee.

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