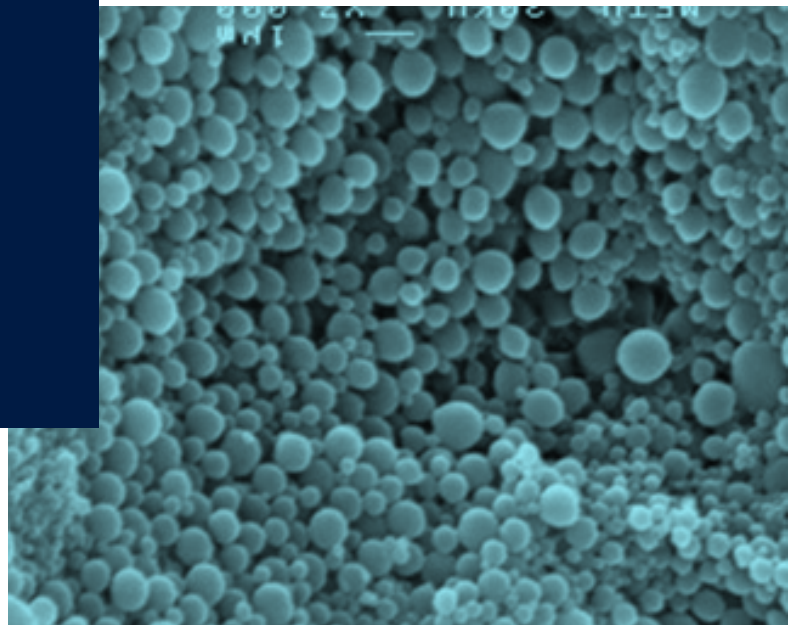


37th Annual Research Symposium

UCSF Department
of Surgery



Katherine A. Gallagher, MD
2024 Dunphy Visiting Professor

May 8, 2024

7:00am – 4:15pm

521 Parnassus Avenue
Room CS-0101



<https://tiny.ucsf.edu/RRD2024>

A Tradition of Excellence



J. Englebert Dunphy, MD

Professor of Surgery and Chair of the Department from 1964 to 1975

Dr. Dunphy earned his medical degree at Harvard Medical School and completed his surgical residency training at the Peter Bent Brigham Hospital in Boston. He then joined the faculty at Harvard before accepting the position of the Chair for the Department of Surgery at the University of Oregon. In 1964, Dr. Dunphy accepted the position of the Chair for the Department of Surgery at the University of California, San Francisco.

Dr. Dunphy was president of the Society of University Surgeons, the American Surgical Association, and the American College of Surgeons. He received honorary fellowships in six foreign colleges of surgeons as recognition of his international stature.

Dr. Dunphy was renowned for excellence in many aspects of surgery, with a special interest in the gastrointestinal tract. He was one of the leading surgical educators of his day and was greatly admired and respected by his colleagues and residents. Dr. Dunphy conducted research in wound healing at a basic level. Dr. Dunphy strongly believed that prospective academic surgeons should become grounded in basic science, and he was one of the first surgical leaders in the United States to obtain an NIH training grant supporting residents in the laboratory.

2024 Dunphy Professor



Katherine A. Gallagher, MD
Dunphy Professor

Katherine Gallagher, MD, is Professor of Surgery, Professor of Microbiology and Immunology, and the Leland Ira Doan Research Professor of Surgery at the University of Michigan. Dr. Gallagher is internationally known for her innovative translational research on epigenetic regulation of immune cells during normal and pathologic tissue repair and other cardiovascular disease processes. She is an expert in the molecular pathogenesis of wound repair and has contributed substantially to the understanding of epigenetics in immune cells associated with tissue repair, cardiovascular diseases, sepsis and most recently, COVID-19.

She is, most notably, an exceptionally well-funded researcher supported by multiple R01s and other foundation grants, a member of the National Academy of Medicine, American Society of Clinical Investigation, American Surgical Association, Society of Clinical Surgery, a James IV International Scholar, a Distinguished Fellow of the Society of Vascular Surgery and a Taubman Scholar. Dr. Gallagher is also the Vice Chair of Basic and Translational Science in the Department of Surgery and foundational grants, including the Doris Duke Charitable Foundation and Wylie Scholars, among others. Her work is distinguished for its high quality and impact and has established the connection between epigenetic reprogramming of immune cells in normal and pathologic tissue repair as well as other disease states (Cell Immunity, JEM, PNAS). She is the Chair of the BTSS NIH-study section and is an original member of the NIH-NIDDK Wound Consortium. She is a tremendous mentor to junior faculty and trainees in medical research and has trained many post-doctoral residents to be the next generation of scientists, who have all achieved NIH(F/K) and major society funding (AHA, ADA, ACS, AAS/SUS, SVS). She was awarded the 2022 MICHR mentor of the year for translational science mentoring efforts at the University of Michigan.

Gallagher received a Bachelor of Science degree in physiology and neurobiology from the University of Maryland in 1998, graduating with Highest Honors. She was a Howard Hughes Fellow at the NIH for two years. She graduated summa cum laude from the University of Maryland School of Medicine in 2002. She pursued her general surgery training at the University of Maryland, followed by her vascular surgery training at Columbia University in New York. During her residency, she pursued a post-doctoral research fellowship at the University of Pennsylvania. She has been tenure track faculty at the University of Michigan since 2011.

Her clinical expertise is in complex PAD, having previously directed the CVC multidisciplinary PAD clinic for many years. She currently runs a nationally known program for popliteal entrapment and other non-atherosclerotic pathologies associated with claudication/leg pain at the University. She is on the executive board for Vascular Cures and the Taubman Institute.

Past Visiting Professors

1988	Bernard Langer, MD	Professor and Chairman of Surgery, University of Toronto
1989	William Silen, MD	Professor of Surgery, Harvard Medical School
1990	James Thompson, MD	Professor and Chairman of Surgery, University of Texas, Galveston
1991	Murray Brennan, MD	Professor and Chair of Surgery, Memorial Sloan-Kettering Cancer Center
1992	Richard Simmons, MD	Professor and Chairman of Surgery, University of Pittsburgh
1993	Stephen F. Lowry, MD	Professor of Surgery, Cornell University Medical College
1994	Jared Diamond, PhD	Professor of Physiology, UCLA School of Medicine
1995	Samuel A. Wells, Jr., MD	Professor and Chairman of Surgery, Washington University
1996	Jonathon E. Rhoads, MD	Chief of Surgical Oncology, University of Pennsylvania
1997	Patricia K. Donahoe, MD	Chief, Pediatric Surgical Services, Massachusetts General Hospital
1998	David L. Dunn, MD, PhD	Professor and Chairman of Surgery, University of Minnesota
1999	Ori D. Rotstein, MD	Professor of Surgery, Toronto Hospital
2000	Olga Jonasson, MD	Director of Education and Surgical Services Department
2001	Glenn Steele, Jr., MD PhD	Dean, School of Medicine, University of Chicago
2002	Alexander W. Clowes, MD	Professor of Surgery and Division Chief, Transplant Surgery, University of Washington
2003	Michael Mulholland, MD, PhD	Professor of Surgery and Chairman, University of Michigan
2004	Christian Larsen, MD, PhD	Professor of Surgery, Emory University
2005	Danny O. Jacobs, MD, MPH	Chair, Department of Surgery, Duke University Medical Center
2006	Steven D. Leach, MD	Chief of Surgical Oncology, Johns Hopkins University
2007	M. Judah Folkman, MD	Professor of Pediatric Surgery & Cell Biology, Harvard Medical School
2008	Sir Peter Morris, AC, FRS, FRCS	Director, Centre for Evidence in Transplantation, Royal College of Surgeons
2009	George K. Gittes, MD	Chair of Pediatric Surgery, University of Pittsburgh
2010	Joseph P. Vacanti, MD	Chief, Pediatric Surgery, Massachusetts General Hospital
2011	Monica Bertagnolli, MD	Professor of Surgery, Harvard, Chief, Surgical Oncology, Brigham and Women's Hospital
2012	Michael Harrison, MD	Director Emeritus, Fetal Treatment Center, Professor of Pediatric Surgery, UCSF
2013	Martin Elliott, MD	Professor of Cardiothoracic Surgery, University College London
2014	Clifford Ko, MD	Director, American College of Surgeons National Surgical Quality Improvement Program (NSQIP)
2015	Jennifer Grandis, MD	Associate Vice Chancellor and Director, UCSF Clinical and Translational Science Institute (CTSI)
2016	Robert C. Robbins, MD	President and Chief Executive Officer, Texas Medical Center
2017	Samuel RG Finlayson, MD, MPH	Professor and Chair, Department of Surgery, University of Utah
2018	Carla Pugh, MD	Professor of Surgery, Director of Technology Enabled Clinical Improvement, Stanford University
2019	Lilian S Kao, MD MS	Professor and Division Chief, Acute Care Surgery, University of Texas
2020	Melina R. Kibbe, MD	Professor and Chair, Department of Surgery, University of North Carolina
2021	Jayne Locke, MD, MPH	Professor and Endowed Chair, Division of Transplant Surgery, University of Alabama
2022	Jennifer Waljee, MD, MPH, MS	Associate Professor of Plastic Surgery, University of Michigan
2023	Yuman Fong, MD	Chair, Department of Surgery, City of Hope Medical Center

2023 Symposium Winners



Julie Ann Sosa, MD, Amar Nijagal, MD, Daniel Soroudi, Raymond Yin, Yuman Fong, MD, Hannah Decker, MD, Simon Chu, MD, MS, Elizabeth Danial, Caroline Melhado, MD

Best Presentation: Basic Science or Translational Research

Developing a Genome Editing Strategy to Deliver Alpha-Globin Transgene to Alpha-Thalassemia Major Hematopoietic Stem Cells

Simon N. Chu, MD, MS, Research Year 1, UCSF General Surgery

Honorable Mention: Basic Science or Translational Research

Patterns of Gene Expression and Immune Cell Proliferation Differ Significantly in Liver Transplant Recipients with Hepatocellular Carcinoma

Audrey E. Brown, MD, Research Year 2, UCSF General Surgery

Best Presentation: Clinical or Outcomes Research

Examining the Association of Housing Status with Stage at Diagnosis and Outcomes for Colorectal and Lung Cancer in a National Sample of Veterans

Hannah C. Decker, MD, Research Year 1, UCSF General Surgery

Honorable Mention: Clinical or Outcomes Research

Improving Mortality for Injured Children: Pediatric Readiness in US Trauma Centers

Caroline Melhado, MD, Research Year 2, UCSF General Surgery

Best Presentation: Medical Student Research

Characteristics and Outcomes of Hand Infection Patients at an Urban Safety-Net Hospital

Matthew McLaughlin, Daniel Soroudi & Raymond Yin, Medical Students, UCSF

Honorable Mention: Medical Student Research

Traditional Versus Virtual Surgical Planning for Correction of Delayed Presentations of Craniosynostosis

Elizabeth Danial, Medical Student, UCSF

QR Code and Zoom Link

This event will be held in-person in room CS-0101 on the Parnassus campus, with live streaming option available for remote attendees.

Scan QR code or click link below to join live sessions.
For audio only, dial 1 (213) 338-8477 and enter ID/password as listed below.

<https://ucsf.zoom.us/j/99320932754?pwd=ZGovZC9KWEhzS2tBRzY5V3lvMUNCQT09>

Webinar ID: 993 2093 2754 | Passcode: 703635



Sign-In Sheet for In-Person Attendees

Please take a moment to sign in and log your attendance.

<https://tiny.ucsf.edu/AttendRRD2024>



2024 Symposium Program

7:00 AM - 7:10 AM	Welcome Remarks & Introductions Julie Ann Sosa, MD, MA Leon Goldman Distinguished Professor & Chair, UCSF Department of Surgery Amar Nijagal, MD Assistant Professor of Surgery & Director, 37th Annual Research Symposium
7:10 AM - 8:50 AM	Session 1: Clinical
9:10 AM – 10:30 AM	Session 2: Basic and Translational Science
11:00 AM – 12:25 PM	Session 3: Clinical and Disparities
12:25 – 1:40 PM	Lunch Break – boxed lunches provided Learner Forum with Dr. Gallagher – <i>no faculty allowed</i>
1:40 – 2:45 PM	Session 4: Innovation, Education and Global Health
3:00 – 4:00 PM	Keynote Lecture <i>Katherine Gallagher, MD, 2024 Dunphy Professor</i> <i>Introduction by: Michael Conte, MD</i>
4:00 – 4:15 PM	Awards & Closing Remarks <i>Amar Nijagal, MD</i>

All abstracts included in this booklet in the order of presentation.

2024 Symposium Program

Presentation Type:

Standard

Quick Shot

7:10 AM SESSION 1: Clinical

7:10 AM	Germline Polygenic Risk For Thyroid Autoimmunity Associated With Overall Survival in the I-SPY2 Trial <i>Kirkpatrick Fergus MD, MAS, Research Resident, Year 1, UCSF General Surgery</i>
7:20 AM	Generative-AI Can Accurately Populate Vascular Quality Initiative Procedural Databases Using Narrative Operative Reports <i>Colleen Flanagan MD, Research Resident, Year 1, UCSF Vascular Surgery</i>
7:30 AM	A Novel Preoperative Risk Score to Identify Patients at High Risk for Non-Home Discharge After Elective Open Abdominal Aortic Aneurysm Repair <i>Joel Ramirez MD, Research Resident, Year 2, UCSF Vascular Surgery</i>
7:40 AM	Comparing Patient-centered vs Procedure-centered Protocols in Postsurgical Opioid Prescription at Discharge: An Electronic Health Record Randomized Controlled Study <i>Karen Trang MD, Research Resident, Year 2, UCSF General Surgery</i>
7:50 AM	An Artificial Intelligence Model to Predict Superior Mesenteric Artery Margin Status for Patients with Pancreatic Ductal Adenocarcinoma <i>Jane Wang MD, Research Resident, Year 2, UCSF General Surgery</i>
8:00 AM	Health Care Navigators for Perioperative Advance Care Planning <i>Alexis Colley MD, MS, Research Resident, Year 3, UCSF General Surgery</i>
8:10 AM	Predicting Severe Postoperative Complications After CRS-HIPEC: An Externally Validated Machine Learning Tool <i>Amir Ashraf Ganjouei MD, Postdoctoral fellow, UCSF Surgery</i>
8:20 AM	Surgical Management of Clinically Node Positive Patients with Breast Cancer After Neoadjuvant Chemotherapy: The Role of Lymph Node Clipping and Localization <i>Kayla Switalla, Medical Student, University of Minnesota</i>
8:30 AM	What to Do When Things Go Wrong: A Simulation for Massive Intraabdominal Hemorrhage <i>Brandon Cowan MD, Research Resident, Year 1, UCSF East Bay Surgery</i>
8:35 AM	The Comparison of Temporary Abdominal Closure (TAC) Following Penetrating and Blunt Trauma <i>Nathan Alcasid MD, Research Resident, Year 2, UCSF East Bay Surgery</i>
8:40 AM	Appropriate Use of Endoscopic Ultrasound Biopsy in the Diagnosis of Pancreatic Neuroendocrine Tumors During the SSTR PET Era: Results from an International Delphi Consensus Study <i>Megan Casey, Medical Student, UCSF SOM</i>
8:45 AM	Human-Centered Design to Improve Trauma-Informed Care for Spanish-Speaking Patients Receiving Acute Care Surgery <i>Manami Diaz Tsuzuki, Medical Student, UCSF SOM</i>

2024 Symposium Program

Presentation Type:

Standard

Quick Shot

9:10 AM SESSION 2: Basic and Translational

9:10 AM	Prenatal Lipid Nanoparticle Administration Results in Widespread Biodistribution and Transfection of Hematopoietic Stem Cells <i>Tony Lum MD, Research Resident, Year 1, Mt. Sinai Hospital System</i>
9:20 AM	Improving the Safety of Stem-cell-derived Beta Cell Transplantation with an Inducible Safety Switch <i>Simon Chu MD, MS, Research Resident, Year 2, UCSF General Surgery</i>
9:30 AM	A Promising Protease For The Early Detection Of Pancreatic Cancer in Branch/Mixed-Intraductal Papillary Mucinous Neoplasms (BD/Mixed-IPMNs) <i>Kelli Ifuku MD, Research Resident, Year 2, Valley Health System</i>
9:40 AM	Deciphering the Symphony of Hematopoiesis: TPO, SCF, and HSPC Dynamics <i>Devesh Sharma MD, Postdoctoral fellow, UCSF</i>
9:50 AM	Aire-expressing Tumor Associated Macrophage (ATAM) Gene Signature associated with Reduced Survival in Multiple Human Cancers <i>Han Yin, Medical Student, UCSF SOM</i>
10:00 AM	Aire-expressing cells in lactating mouse mammary tissue <i>Eva Gillis-Buck MD, Research Resident, Year 1, UCSF General Surgery</i>
10:05 AM	Constitutively active Notch driven by Bmx(PAC)-CreERT2 improves ischemic recovery in mice <i>Curtis Woodford MD, Research Resident, Year 1, UCSF Vascular Surgery</i>
10:10 AM	Perinatal Liver Inflammation Leads to Persistent Activation of Hematopoietic Progenitors through the CXCR3-CXCL10 Axis <i>Suruthi Baskaran MBBS, MS, Postdoctoral fellow, UCSF</i>
10:15 AM	Co-Localization of Tumor Associated Macrophages and Regulatory T Cells May Signify the Presence of Immunoregulatory Niches in Human Hepatoblastoma <i>Phoebe Miller MD, MS, Resident, PGY2, UCSF General Surgery</i>
10:20 AM	Development of an Autonomous Platform for Tissue Culture and Storage in Low Earth Orbit <i>Juan Reyna MD, Research Resident, Year 1, UCSF General Surgery</i>
10:25 AM	Utilization of Dermal Regeneration Templates in the Surgical Management of Hidradenitis Suppurativa: A Systematic Review <i>Cameron Ward, Medical Student, CNUCOM</i>

2024 Symposium Program

11:00 AM SESSION 3: Clinical and Disparities

- 11:00 AM The Representation Of Racial And Ethnic Groups In Surgical Randomized Trials
Ali Abbasi MD, Research Resident, Year 1, UCSF General Surgery
- 11:05 AM The Implementation and Evaluation of a National Trauma Informed Care Curriculum Pilot: A Single-Center Experience
Jon Freise MD, MS, Research Resident, Year 1, UCSF General Surgery
- 11:10 AM Using Human Centered Design (HCD) to Develop Prototypes to Improve the Discharge of Unhoused Hand Infection Patients
Alap Patel MD, Research Resident, Year 1, UCSF Plastic & Reconstructive Surgery
- 11:15 AM Intravascular Volume Assessment with Novel 4D Volumetric M-Mode Ultrasound Technique in Trauma Patients
Sahil Patel MD, Research Resident, Year 1, UCSF East Bay Surgery
- 11:20 AM Is Interval Repeat Computed Tomography Angiography for Grade 1 Blunt Cerebrovascular Injuries Cost-Effective?
Cynthia Susai MD, Research Resident, Year 2, UCSF East Bay Surgery
- 11:25 AM Oncologic Safety of Immediate Oncoplastic Surgery Compared to Standard Breast Conserving Surgery for Patients with Invasive Lobular Carcinoma
Israel Falade, Medical Student, UCSF SOM
- 11:30 AM Financial Toxicity in Breast Cancer Patients at a Safety-net Community Hospital
Katie Kenny, Undergraduate Student, UC Berkeley
- 11:35 AM Utility of Drains in Abdominal Wall Reconstruction: Outcomes and Best Practices
Mitchell Koss, Medical Student, UCSF SOM
- 11:40 AM Machine Learning Improves Post-Transplantation Hepatocellular Carcinoma Recurrence Prediction
Jonathan Li, Medical Student, UCSF SOM
- 11:45 AM Pain Management in Abdominal Wall Reconstruction: The Association between TAP Blocks and Narcotic Prescription at Time of Discharge
Angelica McDaniel, Medical Student, UCSF SOM
- 11:50 AM Hospital Experience by Language Proficiency: A Qualitative Study of Older Adults
Kelsey Ogomori, Medical Student, UCSF SOM
- 11:55 AM Evaluating Plastic and Reconstructive Surgery Programs' Involvement in Diversity, Equity, and Inclusion
Chris Perez, Medical Student, Touro University
- 12:00 PM Evaluating the Efficacy of Artificial Intelligence in Hand Surgery
Daniel Soroudi, Medical Student, UCSF SOM
- 12:05 PM Meta-Analysis of Plastic Surgery Complex Groin Closures after Vascular Interventions
Jack Thiara, Medical Student, UC Davis/UCSF
- 12:10 PM What is the True Prevalence of Clinically Relevant Pancreatic Cystic Lesions in Our Society? A Study of 21,651 Healthy Individuals with Whole-Body Preventative MRI Screening
Paul Wong, Medical Student, UCSF SOM
- 12:15 PM The Association of Housing Status Changes with Lung, Colorectal, and Breast Cancer Outcomes in a National Sample of Veterans
Hannah Decker MD, Research Resident, Year 2, UCSF General Surgery

2024 Symposium Program

1:40 PM	SESSION 4: Innovation, Education and Global Health
1:40 PM	Designing the First Trauma Surgery Fellowship for East/Central Africa: A Survey of Ugandan Residents and Faculty <i>Alan Zambeli-Ljepović MD, MHS, Research Resident, Year 1, UCSF General Surgery</i>
1:50 PM	What's the Plan? Communication and Critical Thinking in the Texting Age <i>Riley Brian MD, Research Resident, Year 2, UCSF General Surgery</i>
2:00 PM	Impact of Reducing Time with Colostomies on Experience of Social Stigma for Children with Anorectal Malformations in South-Western Uganda <i>Caroline Stephens MD, MPH, Research Resident, Year 2, UCSF General Surgery</i>
2:10 PM	Development of a Medical Student Robotic Surgery Bedside Assist Curriculum <i>Camilla Gomes MD, MSc, Research Resident, Year 1, UCSF General Surgery</i>
2:15 PM	Combating the Learning Curve for DIEP Flaps: Preliminary Results from a Cognitive Task Analysis Study <i>Jacquelyn Knox MD, Research Resident, Year 1, UCSF Plastic & Reconstructive Surgery</i>
2:20 PM	Results from an Intraoperative Entrustable Professional Activity (EPA) Assessment Tool Pilot: What Aren't We Measuring? <i>Alyssa Murillo MD, MSc, Research Resident, Year 1, UCSF General Surgery</i>
2:25 PM	Impact of the FDA Pediatric Device Consortia Program: A 15-Year Single Program Experience <i>Thomas Sorrentino MD, Research Resident, Year 2, UCSF General Surgery</i>
2:30 PM	MediStim Transit-time Flow Measurements of Coronary Artery Bypass Conduits in a Veteran Population <i>Shiv Verma, Medical Student, Frank H. Netter SOM at Quinnipiac University</i>

All abstracts included in this booklet in the order of presentation.

Title: Germline polygenic risk for thyroid autoimmunity associated with overall survival in the I-SPY2 Trial

Authors: Kirkpatrick B. Fergus MD MAS¹, Pooja Middha MPH PhD², Zoe Quandt MD², Yiwey Shieh MD MAS³, Amrita Basu PhD¹, Rosalyn Sayaman PhD⁴, Paula Pohlman MD PhD⁵, Douglas Yee MD⁶, Rebecca Shatsky MD⁷, Claudine Isaacs MD⁸, Michael Campbell PhD¹, Gillian Hirst PhD¹, Lamorna Brown-Swigart MD⁴, Laura Van 'T Veer PhD⁴, Elad Ziv MD², Laura Esserman MD MBA¹

¹University of California – San Francisco, Department of Surgery, San Francisco, CA, USA

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³Weill Cornell Medicine, Department of Population Health Sciences, New York, NY, USA

⁴University of California – San Francisco, Department of Laboratory Medicine, San Francisco, CA, USA

⁵MD Anderson, Department of Breast Medical Oncology, Houston, TX, USA

⁶University of Minnesota, Department of Hematology, Oncology, and Transplantation, Minneapolis, MN, USA

⁷University of California – San Diego, Department of Medicine, San Diego, CA, USA

⁸Georgetown University, Department of Medicine, Washington DC, USA

Introduction: Germline genetic variation influences immune activity and risk of autoimmunity and has been hypothesized to play a role in response to cancer therapeutics and survival. Here, we aim to investigate the association between a polygenic risk score for hypothyroidism (PRS-H) and response to therapy in women with early-stage breast cancer and hypothesize that high PRS-H will be associated with better treatment response and survival based on prior association studies.

Methods: This study includes 1,368 women aged 18 years and above with stage II-III breast cancer. It is an approved biomarker analysis of the I-SPY 2 trial, which is a phase II, adaptive, randomized platform trial studying novel cancer therapeutics for use as neoadjuvant chemotherapy for early-stage breast cancer. Using the Cox proportional hazards model, we evaluate the association between a previously published PRS-H and overall survival. Models are adjusted for age at screening, immunotherapy status, and five principal components.

Results: Among 1,368 early-stage breast cancer women, 33% (n=447) had pCR, and 85% (n=1,157) were alive at the last follow-up. Additionally, 16% (n=219) of women received immunotherapy. We observe a significant association between PRS-H and OS (HR = 0.78, 95% CI 0.66-0.92, p=0.004). Individuals in the top 10th percentile of the PRS-H (highest genetic risk) have improved survival (log rank p=0.04).

Conclusions: Germline genetic variation in thyroid autoimmunity proclivity is associated with improved overall survival in our cohort of women with early-stage breast cancer receiving neoadjuvant chemotherapy. Our findings suggest that the genetic risk for autoimmunity may be important for long-term survival.

Title: Generative-AI can accurately populate Vascular Quality Initiative procedural databases using narrative operative reports

Authors: Colleen P. Flanagan, MD, Karen Trang, MD, Joyce Nacario, RN, Warren J. Gasper, MD, Michael S. Conte, MD, Peter A. Schneider, MD, Elizabeth Wick, MD, Allan M. Conway, MD

Objectives: Participation in the Vascular Quality Initiative (VQI) provides important resources to surgeons, but the ability to do so is often limited by time and data entry personnel. Large language models (LLMs) such as ChatGPT (OpenAI) represent generative artificial intelligence (AI) products that may help bridge this gap. Trained on large volumes of data, the models are used for natural language processing (NLP) and text generation. We evaluated the ability of LLMs to accurately populate VQI procedural databases using operative reports.

Methods: A single-center retrospective study was performed using institutional VQI data from 2021-2023. The 50 most recent procedures for carotid endarterectomy (CEA), endovascular aneurysm repair (EVAR) and infrainguinal bypass (BYP) were analyzed using Versa, a HIPAA-compliant institutional version of ChatGPT. We created an automated function to analyze operative reports and generate a shareable VQI file using both gpt-35-turbo and the more powerful gpt-4. Application of the LLMs was accomplished with a cloud-based application programming interface. The outputs of this model were compared to VQI data for accuracy. We defined a metric as 'missing' if it was discussed by surgeons in $\leq 20\%$ of operative reports.

Results: 150 operative notes were analyzed, including 50 CEA, 50 EVAR, and 50 BYP. These procedural VQI databases included 25, 179, and 51 metrics, respectively. For all fields, gpt-35-turbo had a median accuracy of 84.0% for CEA (IQR 80.0-88.0%), 92.2% for EVAR (IQR 87.2-94.0%), and 84.3% for BYP (IQR 80.2-88.1%). There were 3 of 25, 6 of 179, and 7 of 51 VQI metrics missing from the operative reports, respectively. Some examples of missing metrics were patch manufacture in CEA (though patch type was always discussed, and discerned with 96% accuracy by the models), dressing type in BYP, and whether an imaging assistance technology was used during EVAR. Excluding these, the median accuracy rate was 95.5% for each CEA procedure (IQR 90.9-100.0%), 93.2% for BYP (IQR 90.2-96.4%) and 94.8% (IQR 92.2-98.5) for EVAR (Table). Across procedures, gpt-4 did not meaningfully improve performance compared to gpt-35 (student t-test $p=0.97, 0.95, 0.85$ for CEA, BYP, EVAR overall performance). The cost for 150 operative reports analyzed with gpt-35-turbo and gpt-4 were \$0.12 and \$3.39, respectively.

Conclusion: LLMs can accurately populate VQI procedural databases with both structured and unstructured data, while incurring only minor processing costs. Increased workflow efficiency may improve center ability to successfully participate in the VQI. Further work examining other VQI databases and methods to increase accuracy are needed.

VQI Metric	gpt-35-turbo	gpt-4	p-value	Type of Data
Procedure Date	100%	100%	0.99	Structured
Anesthesia	100%	100%	0.99	Unstructured
CEA Type	82%	94%	0.35	Unstructured
Urgency	84%	84%	0.97	Unstructured
Shunt	86%	84%	0.48	Unstructured
Side	100%	100%	0.99	Structured
Completion Arteriogram	98%	98%	0.96	Structured
Completion Doppler	72%	78%	0.58	Unstructured
Completion Duplex	72%	72%	0.89	Unstructured
Concomitant CABG	100%	100%	0.99	Structured
Concomitant Distal Endovascular Procedure	100%	100%	0.99	Structured
Proximal Endovascular Procedure	100%	100%	0.99	Structured
Other Concomitant Arterial Operation	100%	100%	0.99	Structured
Patch Brand Name	14%	14%	0.99	Structured
Patch Manufacturer	0%	0%	0.99	Structured
Patch Type	96%	96%	0.78	Structured
Drain	94%	94%	0.89	Unstructured
Protamine	100%	100%	0.99	Structured
Dextran	100%	100%	0.99	Structured
Heparin	100%	100%	0.99	Structured
Stump Pressure	86%	86%	0.88	Unstructured
EEG	92%	90%	0.45	Structured
Other Neuro Monitoring	84%	84%	0.99	Structured
Re-exploration	96%	96%	0.76	Unstructured
Skin Prep	98%	88%	0.16	Unstructured
Total Procedure Time	0%	0%	0.91	Structured

Table. Accuracy rate of ChatGPT large language models at populating the carotid endarterectomy VQI database, shown here by metric and the type of data that is extracted from the operative report.

A Novel Preoperative Risk Score to Identify Patients at High Risk for Non-Home Discharge After Elective Open Abdominal Aortic Aneurysm Repair

Joel L. Ramirez, Eric Sung, Warren J. Gasper, Michael S. Conte, Laura T. Boitano, Jesus G. Ulloa, James C. Iannuzzi

Introduction: For home-dwelling patients undergoing elective surgery, the need for non-home discharge (NHD) to a rehabilitation or skilled nursing facility can have implications on quality-of-life and long-term outcomes. We aimed to identify independent predictors of NHD following elective open abdominal aortic aneurysm repair (OAR), and to create a clinically useful preoperative risk score.

Methods: Elective OAR were queried from the SVS Vascular Quality Initiative 2013-2022. A risk score was created by splitting the data set into two-thirds for development and one-third for validation. A parsimonious stepwise hierarchical multivariable logistic regression controlling for hospital level variation was performed in the development dataset, and the beta-coefficients were used to assign points for a risk score. The score was then validated, and model performance assessed.

Results: Overall, 8,274 patients were included and 1,502 (18.2%) required NHD. Patients who required NHD were more likely to be ≥ 80 years old, female, not independently ambulatory, anemic, and have COPD, ASA class ≥ 4 , and a suprarenal proximal clamp (all $P < 0.05$). Multivariable analysis in the development group identified independent predictors of NHD, which were used to create a 14-point risk score (Table). Patients were stratified into three groups: low risk (0-4 points; $n=4,966$) with an NHD rate of 9.9%, moderate risk (5-6 points; $n=2,442$) with an NHD rate of 25.5%, and high risk (≥ 7 points; $n=886$) with an NHD rate of 44.6%.

Conclusions: This novel risk score can predict NHD following elective OAR using characteristics that can be identified preoperatively and may allow for improved preoperative counseling.

	Odds Ratio	95% Confidence Interval	P Value^a	Points to Add
Age: ref <60 years				
60-69 years	1.92	1.28-2.87	0.002	1
70-79 years	4.27	2.88-6.33	<0.001	2
≥ 80 years	10.9	6.79-17.6	<0.001	3
Not Independently Ambulatory	3.03	2.22-4.12	<0.001	3
Clamp: ref Infrarenal				
Suprarenal	1.25	1.03-1.52	0.024	1
Supraceliac	1.80	1.33-2.44	<0.001	2
Hypogastric Artery Occlusion	1.64	1.24-2.16	<0.001	1
Anemia (Hb <12 g/dL)	1.56	1.27-1.91	<0.001	1
COPD	1.52	1.32-1.75	<0.001	1
Female	1.45	1.24-1.71	<0.001	1
Hypertension	1.36	1.07-1.74	0.013	1
ASA Class ≥ 4	1.24	1.01-1.53	<0.001	1

ASA = American Society of Anesthesiologists; COPD = chronic obstructive pulmonary disease.
^aAdjusted for Medicare/Medicaid insurance.

Comparing Patient-centered vs Procedure-centered Protocols in Postsurgical Opioid Prescription at Discharge: An Electronic Health Record Randomized Controlled Study

Karen Trang MD, Jory Purvis, Jassmine VanSise, Tasce Bongiovanni MD, Logan Pierce MD, Elizabeth Wick MD, Zhonghui Guan MD

Introduction

Surgeons often follow procedure-centered guidelines like Michigan OPEN for post-operative opioid prescribing, but a 'one-size-fits-all' strategy may not be ideal for pain management. We hypothesize that a patient-centered approach, informed by individual opioid consumption in the hospital, will lead to more appropriate opioid post-discharge prescriptions compared to a procedure-centered approach.

Methods

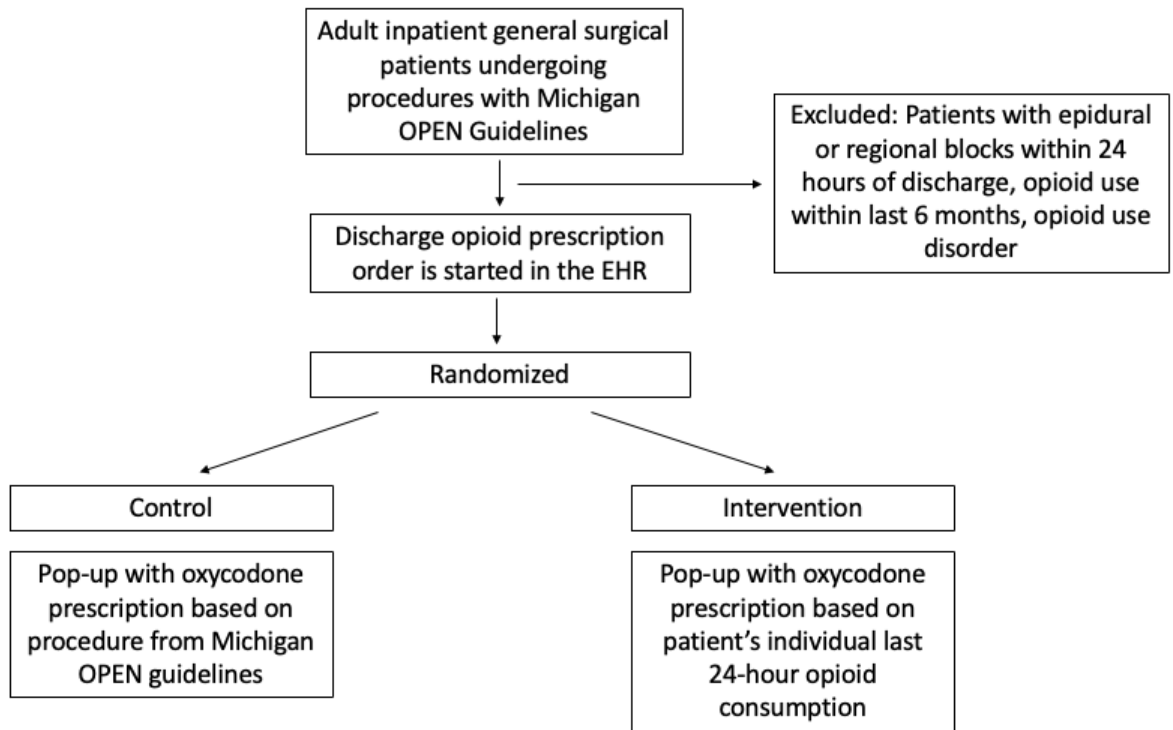
This is an electronic health record-embedded randomized controlled study, randomized at the patient level. The discharging provider will be presented with a suggested discharge opioid prescription either informed by the Michigan OPEN guidelines or the patient's prior 24-hour opioid consumption in the hospital. Opioid naïve adult (≥ 18 years old) patients undergoing inpatient surgical procedures included in the Michigan OPEN guidelines will be included. The initial phase will evaluate feasibility, focusing on the adherence to clinical decision support and monitoring errors or adverse events as key outcomes. In the secondary phase, the focus will shift to assessing the impact on patient outcomes including opioid prescription amounts, refill rates, and patient reported outcomes from a short questionnaire.

Results/Progress

The trial is starting in March 2024, data will be analyzed and presented at resident research day. We anticipate that 50 patients, eligible under the enrollment criteria and undergoing procedures in general surgery, foregut, colorectal, and oncology, will participate in the study.

Conclusions

This study uses EHR interventions in a randomized control setting to evaluate the effectiveness of patient-centered versus procedure-centered opioid prescribing post-surgery, aiming to improve pain management and reduce opioid risks. It underscores the need for adopting dynamic EHR information to guide practice.



An Artificial Intelligence Model to Predict Superior Mesenteric Artery Margin Status for Patients with Pancreatic Ductal Adenocarcinoma

Jane Wang, MD, Amir Ashraf Ganjoui, MD, MPH, Fernanda Romero-Hernandez, MD, Laleh Foroutani, MD, Timothy Donahue, MD, Mohamed Adam, MD, Adnan Alseidi, MD, EdM

Introduction: Current modalities to predict vascular invasion in pancreatic ductal adenocarcinoma (PDAC) have limited accuracy, and the incidence of positive margins after pancreaticoduodenectomy (PD) remains high. We aimed to develop a deep-learning framework using preoperative CT scans (CTs) to predict superior mesenteric artery (SMA) margin status and hypothesize that the artificial intelligence (AI) algorithm's performance will be noninferior to that of expert clinicians.

Methods: Adults with resectable or borderline-resectable PDAC who underwent PD +/- neoadjuvant chemotherapy and had contrast-enhanced CTs within eight weeks preoperatively were included (2010-2022). Patients who received neoadjuvant radiation were excluded. The SMA was manually annotated on CTs, and these annotations were used to train an AI algorithm to predict SMA margin status. Radiologists and surgical oncologists also reviewed the CTs in a blinded fashion. SMA margin status determined by pathology review was the reference.

Results: Two hundred patients were included. Table 1 summarizes the performance of the radiologists, surgeons, and algorithm. All three readers demonstrated limited sensitivity, although the AI algorithm had the highest sensitivity at 0.43 (versus 0.23 and 0.36 for the radiologists and surgeons, respectively). Specificity was universally excellent, with the radiologist and AI algorithm demonstrating the highest specificity at 0.94. Finally, the accuracy of the model was 0.85 versus 0.80 and 0.76 for the radiologists and surgeons, respectively.

Conclusion: We developed a deep-learning framing to predict SMA margin status using preoperative CTs. Although sensitivity was limited for all readers, the AI algorithm demonstrated overall equivalent to superior performance in detecting SMA margin status compared to expert clinicians.

Table 1. Performance of Radiologists, Surgeons, and the AI Model in Predicting Superior Mesenteric Artery Margin Status

	Sensitivity	Specificity	PPV	NPV	Accuracy	F1 score
Radiologists	0.23	0.94	0.46	0.84	0.80	0.31
Surgeons	0.36	0.86	0.39	0.85	0.76	0.37
AI Model	0.43	0.94	0.60	0.89	0.85	0.50

PPV, Positive Predictive Value; NPV, Negative Predictive Value; AI, Artificial Intelligence

Health Care Navigators for Perioperative Advance Care Planning

Alexis Colley, Adrian Valderrama, Victoria Tang, Logan Pierce, Rebecca L. Sudore, Elizabeth Wick

Introduction

The need for surgical intervention can signal declining health for older adults. Therefore, the period before a major operation may be an opportune time to engage in Advance Care Planning (ACP). We sought to evaluate integrating a rigorously evaluated, patient-centered tool into an electronic health record (EHR) patient portal message prior to surgical consultation.

Methods

This retrospective cohort study included a subset of patients ≥ 65 years or with serious illness, who were scheduled for a new patient surgery clinic visit. Before the visit, a message was sent in the EHR patient portal explaining ACP. A healthcare navigator (HCN) did follow-up telephone outreach.

The primary outcome was a new Advance Directive (AD) uploaded in EHR within 90 days of message receipt. Secondary outcomes were a composite of clinically meaningful ACP. Descriptive statistics were performed using all available covariates considering P values less than .05 to be statistically significant.

Results

2,551 new surgical patients (mean [SD] age, 71 [9.0] years) received the EHR message. Of these, 24.3% (n=499) were also contacted by a HCN (Table 1) and were more likely to have a newly uploaded AD (9.4% vs. 3.6%, $p < 0.001$). At one year, clinically meaningful ACP documentation was more common in the HCN group vs. the message-only group (72.9% vs. 15.2%, $p < 0.001$).

Conclusions

For older adults being evaluated for a major elective operation, the addition of HCN navigator outreach to a standardized message was associated with significantly more ACP-related documentation. Efforts are needed to tailor the HCN resource and to simplify documentation upload.

Table 1. Frequency of clinically meaningful ACP between the message only group and those who also received a call from a navigator.

		N (%)	
		Message Only N = 2051	Message + Navigator N = 499
Primary outcome			
	New AD	74 (3.6%)	47 (9.4%)
Secondary outcome			
	New scanned ACP documentation (AD, POLST)	90 (4.4%)	51 (10.2%)
	New ACP CPT code	7 (0.3%)	4 (0.8%)
	New ACP Notes	25 (1.2%)	3 (0.6%)
	New .ACP SmartLink	243 (11.8%)	360 (72.1%)
Total New Clinically Meaningful ACP		311 (15.2%)	364 (72.9%)

Title: Predicting Severe Postoperative Complications After CRS-HIPEC: An Externally Validated Machine Learning Tool

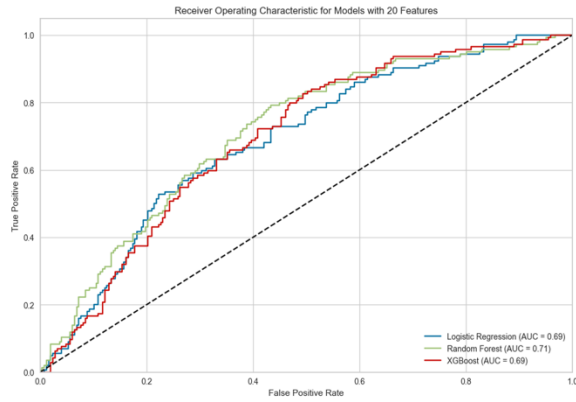
Authors: Amir Ashraf Ganjoui, MD, MPH, Jane Wang, MD, Christopher Yi, BS, Fernanda Romero-Hernandez, MD, Adnan Alseidi, MD, EdM, Daniel Abbott, MD, Syed Nabeel Zafar, MD, MPH, Patrick Schwartz, MD, PhD, Keith F. Fournier, MD, Charles A. Staley, MD, Sean Dineen, MD, Mustafa Raof, MD, MS, David L. Bartlett, MD, Jordan M. Cloyd, MD, Haroon Choudry, MD, Mohamed Adam, MD

Introduction: Available decision support tools that predict postoperative complications after cytoreductive surgery with hyperthermic intraperitoneal chemotherapy (CRS-HIPEC) are limited by small sample sizes and lack of external validation. Our objective was to develop an externally validated machine learning tool that can predict severe complications (Clavien-Dindo grade \geq 3) after CRS-HIPEC using two large datasets.

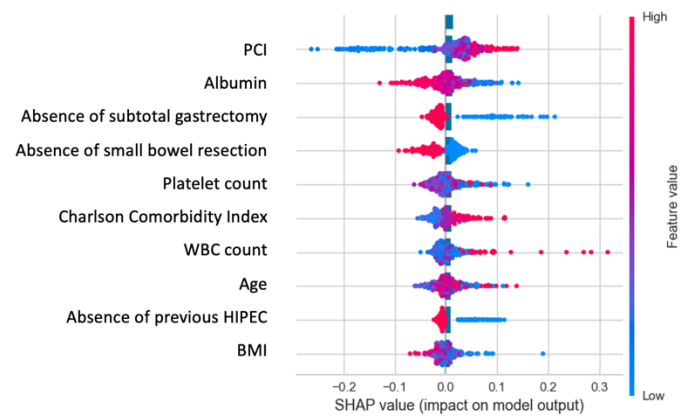
Methods: The dataset, which included adult patients who underwent CRS-HIPEC at a high-volume institution (UPMC), was divided into training and internal validation datasets at an 80:20 ratio. For external validation, we used the US HIPEC collaborative dataset. Three different models were trained and tested, and SHAP values were calculated to assess variable importance.

Results: A total of 37% (n=719/1955) of cases in the UPMC cohort experienced severe postoperative complications, compared to 20% (n=373/1880) in the US HIPEC collaborative dataset. Recursive feature elimination algorithm determined that the optimal performance was achieved with 20 variables. After optimization, the random forest model had the highest area under the ROC (AUROC, 0.71) in the internal validation cohort and was chosen as the final model (Fig. 1A). The random forest model had an AUROC that ranged from 0.60 to 0.73 (mean AUROC 0.65) in the external validation cohorts. Finally, the most important variables associated with severe complications were a higher peritoneal carcinomatosis index, low preoperative albumin level, undergoing major resections (Fig. 1B).

Conclusions: Using the largest cohort of CRS-HIPEC patients in the US, we developed and externally validated a machine learning model that can aid with patient selection, and help providers anticipate complications in the postoperative setting.



A.



B.

1A. ROC plots for logistic regression, random forest, and XGBoost models

Receiver operating characteristic (ROC) curves for logistic regression (AUROC 0.69), random forest (AUROC 0.71), and XGBoost (AUROC 0.69) models after optimization.

1B. SHAP values of the random forest model

The most important features based on the random forest model were a higher peritoneal carcinomatosis index (PCI), low preoperative albumin level, undergoing subtotal gastrectomy or small bowel resection, and low preoperative platelet count.

Surgical Management of Clinically Node Positive Patients with Breast Cancer After Neoadjuvant Chemotherapy: The Role of Lymph Node Clipping and Localization

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Introduction

In neoadjuvant chemotherapy (NAC)-treated, clinically node-positive (cN+) breast cancer patients, the influence of lymph node clipping on axillary surgery, false-negative rates (FNR), and event-free survival (EFS) remains uncertain. We examined these associations in cN+ patients enrolled in a NAC trial.

Methods

We retrospectively analyzed cN+ ISPY-2 patients (2011-2021) who underwent axillary surgery post-NAC. We compared patients with and without clip placement in the biopsy-proven positive lymph node, evaluating type of axillary surgery, FNR, and EFS.

Results

In our study of 801 cN+ patients, 161 (20.1%) underwent pre-NAC lymph node clipping. The proportion of cN+ clipped node patients increased from 2.4% to 36.2% from 2011-2021. The cohort with clipped nodes, compared to those without, had higher proportions of patients with cT1 (3.1% vs 0.5%), cT2 disease (66% versus 58%), and cN1 disease (87% versus 79%). Multivariable regression, adjusted for surgery year, showed nodal clipping was associated with higher odds of sentinel lymph node (SLN)-only surgery (OR 4.9, 95% CI 3.2-7.4, $p < 0.001$). Clip localization correlated with higher rates of successful clipped node retrieval. Yet, completion axillary dissection rates remained consistent regardless of successful clip retrieval. Finally, in cN+ patients undergoing both SLN and axillary lymph node dissection (ALND), there were no differences in FNR or EFS based on nodal clipping.

Conclusions

Clip placement in positive lymph nodes before NAC likely facilitates avoidance of ALND without compromising FNR or EFS. Nodal clip placement at the time of diagnosing cN+ disease appears to be prudent and potentially beneficial, particularly for patients anticipated to respond to NAC.

TITLE: What to Do When Things Go Wrong: A Simulation for Massive Intraabdominal Hemorrhage

Authors:

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2. Jacquelyn Alex Knox, MD – UCSF Plastic Surgery Resident; UCSF Simulation Center ACS-AEI Simulation Fellow
3. Clara Gomez-Sanchez, MD – Assistant Professor, UCSF Division of Vascular and Endovascular Surgery
4. Patricia O’Sullivan, PhD – Professor, UCSF Departments of Medicine and Surgery
5. Hueylan Chern, MD – Professor, UCSF Department of Surgery

INTRODUCTION

Surgical trainees may have a “freeze” response to the stress of encountering massive bleeding in the operating room. We will describe how we developed a perfused surgical simulator that will serve as a component of a crisis-management curriculum to train residents to address this stressful surgical scenario.

METHODS

Discussions with surgeons informed objectives and the need for a model that sufficiently challenges learners and allows practice in a controlled environment. Specifications were designed for a model that replicates a large bleeding vein such as the vena cava, giving trainees experience in vascular exposure and control in a traumatic scenario. A model was developed and each prototype redesigned in response to feedback from residents and faculty in surgical simulation.

PROGRESS

Our first prototype used an inexpensive simulated vessel and a pump to circulate “blood” at a rate and volume replicating human physiology, however lacked visual fidelity and the crucial element of blood pooling. Collaborating with an engineer, the next prototype had housing for the vessel, consisting of a 3D-printed, malleable model of the retroperitoneum, covered with casted silicone pieces to represent bowel. Comments from residents and faculty lead to the third prototype better representing human anatomy.

CONCLUSIONS

Currently, we have a working model ready for pilot testing. We will use it in a simulation focused on developing teamwork, communication and leadership skills in addition to technical skills. Ongoing feedback from educators, surgeons, and residents will guide future iterations to ensure the simulation can meet the desired objectives.

The Comparison of Temporary Abdominal Closure (TAC) Following Penetrating and Blunt Trauma

Nathan Alcasid MD, Carissa Villanueva MD, Elisa Calabrese MD, Cynthia Susai MD, Emily Landry MD, April Mendoza MD, Timothy Browder MD, Gregory Victorino MD

INTRODUCTION: Temporary abdominal closure (TAC) is widely used in the management of critically ill trauma patients, however, direct clinical comparisons between penetrating and blunt mechanisms after damage control laparotomy have not been studied. We hypothesize that the blunt trauma patients undergoing TAC would have increased primary fascial closure (PFC) complications.

METHODS: A retrospective review was performed from 2019-2023 using our trauma database. We identified penetrating and blunt trauma patients who underwent TAC on presentation. Main outcomes included PFC rate and PFC failure rate. PFC failure was defined as fascial dehiscence, enterocutaneous fistula, or anastomotic leak. Multivariable analysis identified independent predictors of PFC failure.

RESULTS: In total, 54 patients were identified: 61% penetrating trauma and 39% blunt trauma. Though blunt injuries had higher injury severity scores (ISS) both groups had similar abdominal-abbreviated injury scale (AIS) scores, while penetrating injuries had higher rates of bowel injuries, >2 relaparotomies, and increased PFC failure. There were no differences in resuscitation with crystalloid or blood products or in PFC rate. On multivariable regression, more relaparotomies (OR:4.8 95% CI:1.2-19; p=0.03) and lower blood product transfusion (OR:0.88 95% CI:0.78-1.0; p=0.04) were the strongest predictors of PFC failure.

CONCLUSIONS: Different trauma mechanisms are associated with different clinical courses and outcomes after TAC. Penetrating injuries had higher rates of bowel injuries, operations, and PFC failure. More relaparotomies and less blood transfusions were the strongest predictors of PFC failure. Deeper understanding of the injury processes in these distinct populations may allow for improved patient selection to mitigate morbidity after TAC.

Appropriate Use of Endoscopic Ultrasound Biopsy in the Diagnosis of Pancreatic Neuroendocrine Tumors During the SSTR PET Era: Results from an International Delphi Consensus Study

Megan Casey, BA, Francesca Tozzi, MD, Jaeyun Jane Wang, MD, Keon Min Park, MD, Mohamed Adam, MD, Nikdokht Rashidian, MD, PhD, Adnan Alseidi MD, EdM

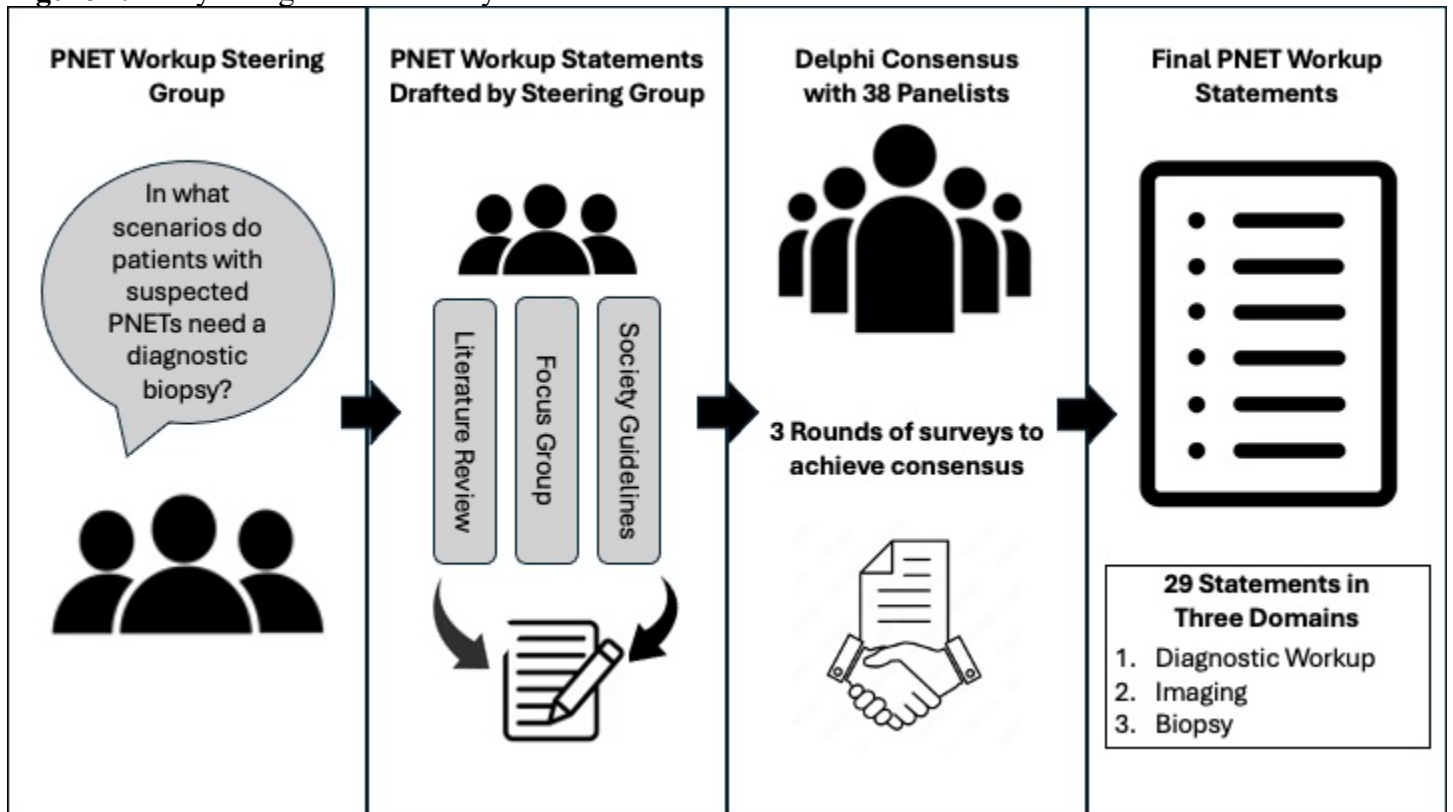
Introduction: Endoscopic ultrasound-guided (EUS) biopsy, which is frequently used in the diagnostic workup of pancreatic neuroendocrine tumors (PNETs), is invasive and associated with several risks. Current guidelines lack clarity regarding the appropriate use of preoperative EUS biopsy in the diagnostic workup of PNETs in the era of somatostatin receptor (SSTR) PET imaging. This study aims to generate consensus on the topic using the Delphi method.

Methods: A three-round modified Delphi process was used. An interdisciplinary panel of experts was recruited. A set of 22 baseline statements in three categories (diagnostic workup, imaging, and biopsy) was developed based on literature review and feedback obtained through a focus group. Voting rounds were conducted via Qualtrics surveys. Statements with >80% agreement were considered to have achieved consensus.

Results: A panel of 38 experts (12 surgical oncologists, 9 medical oncologists, 7 gastroenterologists, 6 nuclear medicine/radiologists, and 4 pathologists) agreed to participate in the study, with response rates of 97%, 100% and 100% in rounds 1, 2, and 3 respectively. In the first round, 14/22 statements achieved consensus. The eight statements that did not achieve consensus were modified and nine new statements were added for voting in the second round. In the second round, 15/17 statements achieved consensus. Panelists voted to approve the final set of 29 statements in the third round.

Conclusion: The Delphi method was successfully employed to generate consensus on the proper use of EUS biopsy in the diagnostic workup of PNETs in the era of SSTR PET imaging.

Figure 1. Study Design and Summary



Human-Centered Design to Improve Trauma-Informed Care for Spanish-Speaking Patients Receiving Acute Care Surgery

Authors: Manami Diaz Tsuzuki BA, Marianna Salvatori BA, Lara Z Chehab MPH, Angelica McDaniel BA, Adrienne Greer MPH, Amanda Samman MD MPH

Introduction: Trauma-informed care (TIC) is a framework to care for patients who have experienced emotional or physical harm resulting in trauma. Professional societies, including the American College of Surgeons, recommend that all trauma centers implement TIC practices. However, little is known about how TIC is delivered to patients with limited English proficiency in acute care surgery settings, leading to disparities in implementation and inequities in care. In this study, we aim to understand the current state of perioperative TIC for Spanish-speaking patients receiving acute care surgery and identify opportunities for improvement.

Methods: We are conducting a qualitative human-centered design (HCD) study at San Francisco General Hospital. We will conduct semi-structured interviews with a purposeful sample of providers across clinical specialty, language fluency, and demographics until we reach thematic saturation. Interviews explore perspectives on TIC for Spanish-speaking patients and will be analyzed using a design synthesis approach to identify themes and HCD insights. HCD insights represent actionable tensions from the themes, allowing for subsequent design activities including brainstorming and co-design of solutions.

Results: Analysis from nine initial provider interviews revealed five key themes: representation, communication, resource constraints, system design, and workforce sustainability (Table 1). Each theme includes an HCD insight that further describes the tension experienced by providers, with a representative quote from the interviews.

Conclusion: The results from this study will highlight the barriers to perioperative TIC for Spanish-speaking patients receiving acute care surgery and identify opportunities for design to advance equity in TIC practice.

Table 1. Themes and Insights from Provider Interviews

Theme	Insight	Quote
Representation	Language concordance, representation, and shared lived experiences facilitate trust and connection.	"And here I come to be the translator. [...] Now they gravitate towards me because I know how to communicate with them and give them a sense of trust, you know what I mean? And it feels good."
Communication	Beyond direct translation, there is a need for connection that can be facilitated by both verbal and non-verbal communication.	"I think 90% of language is unspoken, when you speak to these families. I always try to get eye level with them."
Resource Constraints	There is a lack of capacity to meet immediate needs of non-English speaking patients in time-constrained environments.	"So while maybe an English-speaking patient, you might be able to provide a full explanation in the morning [...], for someone that is non-English speaking, where you have to get an interpreter, it basically takes about three times the amount of time to do that."
System Design	The default system is non-responsive to the needs of Spanish-speaking patients and leaves out vulnerable patients.	"It's not just the language, it's the whole situation and it's the whole system that's the issue."
Workforce Sustainability	Inflexible systems exacerbate the effects of language discordance for providers, leading to moral injury and burnout.	"When I sign up for a patient and I see that they looked like Latino or Latinx name, part of my heart sinks because I know it's going to be a challenging interaction in which I feel like I'm going to miss the patient."

Prenatal Lipid Nanoparticle Administration Results in Widespread Biodistribution and Transfection of Hematopoietic Stem Cells

Tony Lum, Atesh Worthington, Beltran Borges, Marco A. Cordero, Fareha Moulana Zada, Elisa Schrader Echeverri, James Dahlman, Tippi C. MacKenzie

Introduction:

Prenatal somatic cell gene editing is a promising therapeutic strategy for numerous congenital diseases. Lipid nanoparticles (LNPs) have recently emerged as a viable delivery vehicle for mRNAs encoding genome editors. We hypothesize that prenatal LNP delivery can effectively target multiple fetal tissues.

Methods:

LNP carrying Cre recombinase mRNA (LNP-Cre) was injected into the livers of fetal mTmG mice (a reporter strain in which LNP-Cre delivery and subsequent gene editing results in a color change to express GFP) between E13.5-14.5. Pregnancies were allowed to continue until harvest, and various organs were collected for analysis via immunohistochemistry (IHC) and flow cytometry.

Results:

We injected LNP-Cre into 70 fetuses across 11 litters (0.5 ug, n=24; 1.0 ug, n=46). Litter survival rates of both doses averaged 67% per litter, versus 63% in control PBS injections (n=8). IHC revealed transfection of multiple organ systems, including myofibers (skeletal muscle), cardiomyocytes and endothelial cells in the heart, hepatocytes, and lung alveoli. Maternal organ analysis did not reveal transfection in liver or uterus. Additionally, flow cytometry demonstrated transfection of hematopoietic stem cells (HSCs), which reside in the fetal liver, up to 8%.

Conclusion:

We confirmed widespread biodistribution of LNP to multiple organ systems, including into HSCs, which are challenging to transfect postnatally. These promising results support the use of LNP as a vector in the prenatal treatment of congenital disorders such as thalassemias, muscular dystrophies, or cystic fibrosis. Future directions include packaging LNPs with mRNA for Cas9 and guide RNAs to target specific mutations.

Improving the Safety of Stem-cell-derived Beta Cell Transplantation with an Inducible Safety Switch

Simon N. Chu^{1,4,5†}, N. Shabrina Amirruddin^{2,3,4,5†}, Devesh K. Sharma^{1,5}, Isabel C. Sierra^{2,3,4,5}, Peter G. Stock¹, Julie B. Sneddon^{2,3,4,5‡},
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Introduction: In patients with type 1 diabetes mellitus, allogeneic islet transplantation offers a means to restore glucose homeostasis, yet its widespread applicability is hampered by donor scarcity. Pluripotent stem cell-derived beta cells offer a renewable solution of insulin-producing cells, albeit constrained by the risk of teratoma formation post-transplantation. Therefore, for stem cell-derived beta cell transplantation to reach its full therapeutic potential, safety concerns regarding tumorigenesis and teratoma formation must be overcome. Here, we present findings from a CRISPR/AAV-mediated genome engineering strategy aimed at integrating an inducible safety switch into embryonic stem cells, enabling a drug-inducible safeguard to allow for allograft eradication in the case of an adverse event.

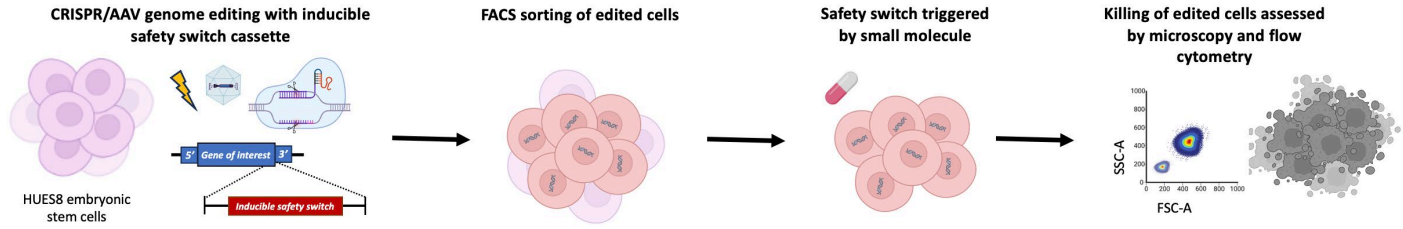
Methods: We identified a Cas9 guide RNA specific to the 3' UTR of the *ACTB* housekeeping gene, which is ubiquitously expressed in all cells. We then designed an iCaspase9-mPlum expression cassette, whose expression is induced by the small molecule A/C heterodimerizer, AP21967. This cassette was then integrated by an AAV6 vector into luciferase-expressing HUES8 cells, linking expression of our integration cassette to *ACTB* expression. Edited HUES8 cells were sorted, expanded, and treated with AP21967, and killing of edited cells was assessed via microscopy and flow cytometry.

Results: HUES8 cells were successfully edited as seen by mPlum positivity on flow cytometry, with both monoallelic and biallelic edited populations obtained. Addition of AP21967 led to killing of edited cells expressing our transgene cassette with the minimal effective dose of 0.01 nM. No non-specific killing in unedited cells was observed.

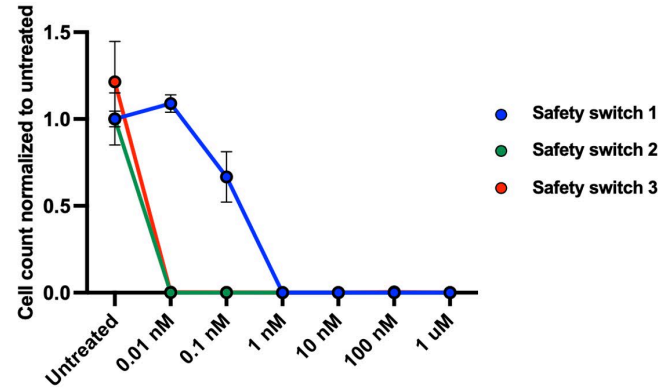
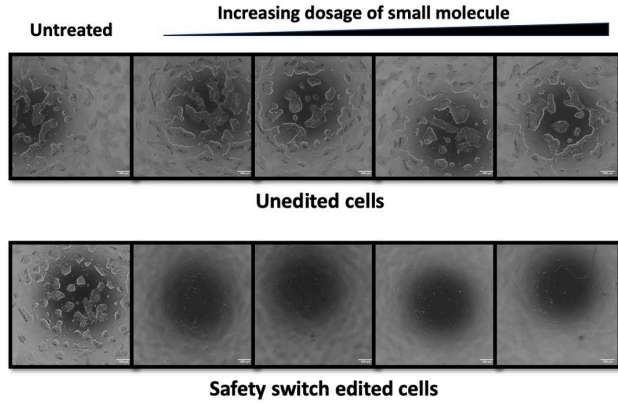
Conclusions: We demonstrate successful editing of HUES8 embryonic stem cells and integration of an inducible safety switch into the *ACTB* locus, allowing inducible killing of pluripotent cells. In successive design-build test cycles, additional safety switches with increasing levels of efficacy have since been developed. Further validation these safety switches and their ability to reduce teratoma risk of edited stem cell-derived beta cells in *in vivo* mouse transplantation experiments is warranted.

Improving the Safety of Stem-cell-derived Beta Cell Transplantation with Inducible Safety Switches

Experimental Design



Inducible Killing of Edited Pluripotent Cells with Small Molecule Administration



Title: A promising protease for the early detection of pancreatic cancer in branch/mixed-intraductal papillary mucinous neoplasms (BD/mixed-IPMNs)

Author: Kelli Ifuku, Tyler Detomassi, Charysa Santos, Charles Craik, Kim Kirkwood

Introduction

IPMNs are the most commonly detected precursor to pancreatic cancer and early detection of advanced neoplasia (high grade dysplasia or invasive cancer, AN) improves survival. Currently, most BD-IPMNs that are resected are benign. There is an unmet need for a microvolumetric diagnostic test that can accurately identify cysts with AN and prevent the overtreatment of low-grade dysplasia (LGD).

Methods

Using multiplex substrate profiling by mass spectrometry, a global protease activity profiling technology, we identified a protease, CK-01, with increased activity in IPMNs with AN. In a pilot cohort of 15 surgically resected IPMNs, protease activity was measured with specific fluorogenic substrates that require 5 μ L of cyst fluid. These results were applied retrospectively to these patients to determine potential clinical impact.

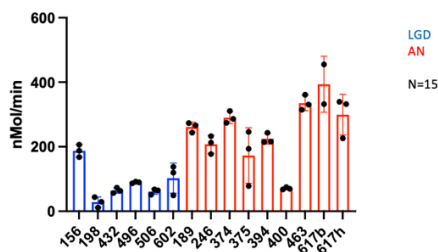
Results

Of the 15 BD/mixed-IPMNs, 9 had AN and 6 had LGD. In this pilot sample, CK-01 correctly identified 13/15 cysts with an AUC of 0.93. At a cutoff of 150 nMol/min, this is a sensitivity of 89% (CI 56-99%) and specificity of 83% (CI 43-99%). 10/16 patients had a preoperative EUS-FNA with cytologic evaluation of the cyst fluid. 4/10 patients had an incorrect or nondiagnostic result. CK-01 correctly graded 3/4 of these nondiagnostic results. Interestingly, CK-01 also correctly classified fluid from 5/5 main duct-IPMNs.

Conclusion

In a pilot study, CK-01 discriminated grade of dysplasia in BD/mixed-IPMNs with an accuracy of 93% and can improve the diagnostic yield of EUS-FNA. Our previously published marker for grade, TPP1, has an accuracy of 59%. These multivolumetric functional analytes may improve accurate classification of IPMNs.

CK-01 differentiates AN from LGD in 15 BD/mixed-IPMNs



Deciphering the Symphony of Hematopoiesis: TPO, SCF, and HSPC Dynamics

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Introduction: Injury triggers a complex immune response, leading to dysregulated cytokine profiles and subsequent hematopoietic dysfunction. While inflammatory cytokines in trauma are well-studied, sustained hematopoietic failure mechanisms remain elusive. Thrombopoietin (TPO) and Stem Cell Factor (SCF) play crucial roles in Hematopoietic Stem and Progenitor Cells (HSPC) homeostasis, yet their specific impact during trauma is poorly understood. We hypothesize trauma-induced TPO-SCF axis dysregulation disrupts HSPCs function, worsening hematopoietic complications. Current treatments, reliant on transfusions, not only inadequately address long-term issues like prolonged anemia but also exacerbate complications. Innovative approaches targeting HSPC restoration are urgently needed to mitigate trauma's long-term effects.

Method: We analyzed classic HSPC subsets using a 12-marker flow cytometry panel. Investigated TPO-SCF effects on HSPC distribution via *ex vivo* experiments using a cytokine cocktail and cultured healthy human HSPCs to evaluate their proliferation and differentiation.

Results: To comprehensively understand the TPO-SCF interplay in injury patients, we aimed to investigate their distinct roles and effects, both in combination and individually. This study addresses a crucial knowledge gap and represents a pivotal first step in our research. We observed a substantial increase in both the proportions and absolute numbers of Long Term-Hematopoietic Stem Cells (LT-HSCs) and Multipotent Progenitors (MPPs) in the condition with absence of SCF, highlights the intricate interplay between these cytokines in regulating hematopoiesis.

Conclusion: This increase in the LT-HSCs in the absence of SCF is promising towards *ex-vivo* human HSC expansion. Future directions include measuring the levels of TPO and SCF in the plasma of patient with trauma.

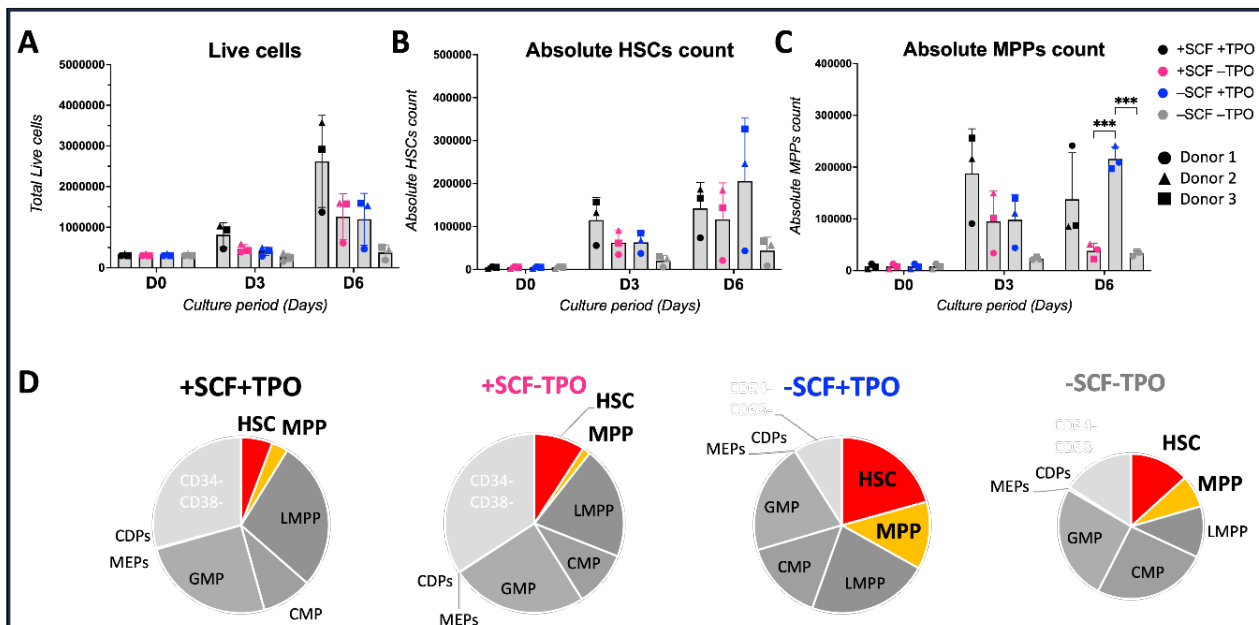


Fig.3: Expansion of HSCs and MPPs in varying combinations of SCF and TPO. A) Total live cell counts on Days 0, 3 and 6. Extrapolated absolute counts of **B)** HSCs and **C)** MPPs based on total live cell counts and % contributions of each HSPC subset detected by flow cytometry. Multiple t-tests were performed (***) $p < 0.001$. **D)** Pie charts showing distinct patterns of overall HSPCs distribution in conditions with varying combinations of SCF and TPO.

Aire-expressing Tumor Associated Macrophage (ATAM) Gene Signature associated with Reduced Survival in Multiple Human Cancers.

Authors: Yin HS, Guldberg SM, Arvedson MP, Gupta AR, Spitzer MH, Gardner JM

INTRODUCTION:

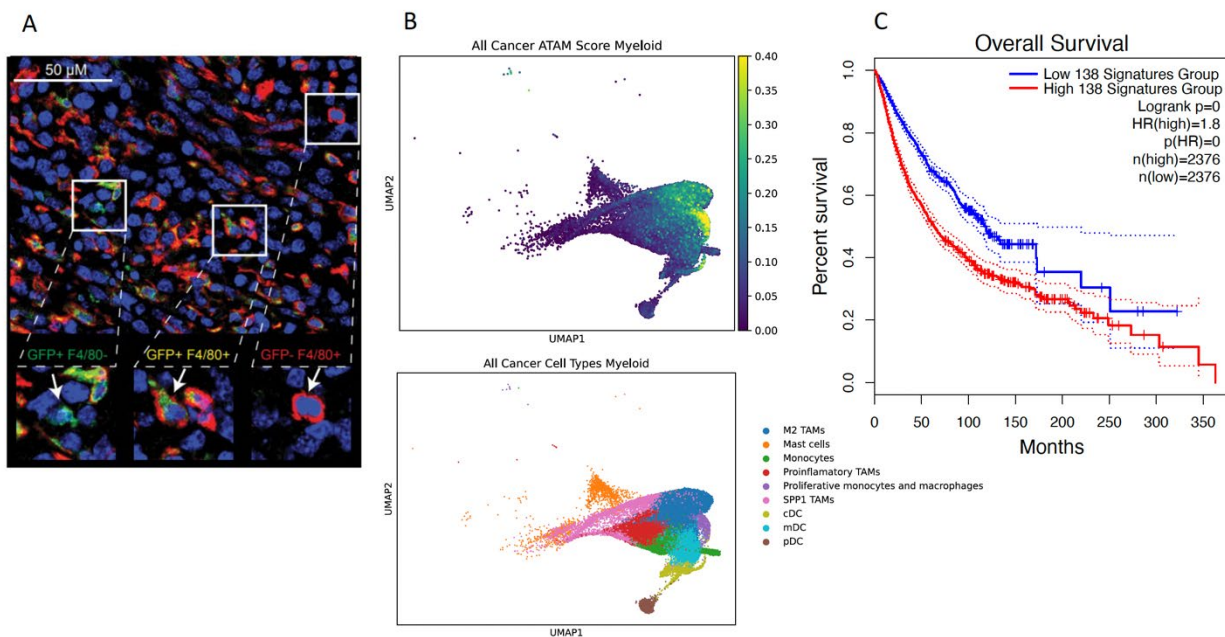
In mice, we have discovered novel populations of Aire-expressing tumor associated macrophages (ATAMs) which appear to play critical roles in tumor immune evasion. Ablation of these populations causes dramatically reduced tumor burden and enhanced response to immune checkpoint inhibitor therapy. Thus, we sought to identify ATAMs in human cancers and investigate the correlation between the presence of ATAMs and survival using publicly available cancer datasets.

METHODS:

A transcriptional signature for ATAMs was determined with differential expression analysis on ATAMs sorted from tumors generated with the MC38 colorectal cancer cell line. Genes enriched in this population were taken to be putative ATAM marker genes. Using this signature, we examined a wide range of previously published human cancer single-cell RNA sequencing datasets to identify ATAMs by transcriptional similarity i.e. ATAM score. We next looked at the disease free and overall survival of patients from the Cancer Genome Atlas (TCGA) stratified by high and low expression of the ATAM gene signature.

CONCLUSIONS: ATAMs are present in human cancers and higher expression of the ATAM gene signature was associated with lower rates of survival in certain cancers.

Figure 1.



A) Immunofluorescence of an MC38 tumor showing co-staining of Aire (GFP) and macrophage marker F4/80(red). B) UMAP plot showing ATAM score (top) and cell identity (bottom) of cells from a human pan cancer tumor infiltrating myeloid cell atlas. C) Kaplan-Meier survival curve of TCGA patients with the top (red) and bottom (blue) quartile of enrichment for ATAM gene signature based on bulk RNA expression data. (cDC: conventional dendritic cell, mDC: migratory dendritic cell, pDC: plasmacytoid dendritic cell)

Title: Aire-expressing cells in lactating mouse mammary tissue

Authors: Eva Gillis-Buck, Matt Arvedson, Nolan Horner, and James Gardner

INTRODUCTION: Autoimmune-regulator gene (Aire) is expressed by a rare population of tolerogenic antigen-presenting cells called extrathymic Aire-expressing cells (eTACs), which support tolerance of the fetus and of melanoma and colon cancer tumors in a mouse model. We hypothesize that eTACs in the lactating mouse mammary tissue promote tolerance of lactation-specific neoantigens and breast cancer tumors, which could explain the poor prognosis of postpartum breast cancers.

METHODS: Using Aire-GFP (Adig) and AireDTR mice, we identify GFP⁺ eTACs in the mammary tissue of virgin, pregnant, and postpartum mice, with WT mice as controls. Using AireDTR mice, we will selectively ablate Aire-expressing cells in postpartum mice, with WT+DT controls. We will inject MCF-7 breast cancer cells into the lactating mammary tissue of WT and AireDTR mice, then treat with DT to ablate eTACs. We will follow tumor size and response to immunotherapy before, during, and after lactation. We will use full spectrum flow cytometry to identify and characterize eTACs, confirm eTACs ablation, and immune phenotype the mammary tissue.

PROGRESS: eTACs are present in lactating postpartum day 2 mammary tissue, but not in the mammary tissue of virgin mice. These eTACs transcriptionally resemble both previously described lactation-specific macrophages and Aire-expressing tumor associated macrophages.

CONCLUSIONS: This is the first report of eTACs in lactating mouse mammary tissue, and these eTACs are similar to previously described Aire-expressing tumor associated macrophages. Next steps include injecting breast cancer cells into postpartum mice and observing tumor growth and response to immunotherapy after ablating eTACs.

Constitutively active Notch driven by *Bmx(PAC)-CreER^{T2}* improves ischemic recovery in mice

Curtis Woodford MD, Feng Cheng PhD, Xuetao Zhang PhD, and Rong A. Wang, PhD

Introduction: Notch signaling is critical in the vasculature in development and pathological conditions. Here we investigated whether expression of constitutively active Notch1 in *Bmx(PAC)-CreER^{T2}*-active lineages prevents ischemic injury in surgical-induced hindlimb ischemia.

Methods: We generated transgenic mice with *Bmx(PAC)-CreER^{T2}* recombinase-mediated expression of *Notch1*, henceforth called *BMX-Notch1** mice. We induced hind limb ischemia using surgical femoral artery transection. We measured recovery from hind limb ischemia using laser doppler perfusion imaging. We are measuring calf vessel density using by immunofluorescent staining of PECAM-1 and calf necrosis using histology. Collateral artery diameter is being measured using microfil casting and tissue clearing.

Results: After femoral artery transection, *BMX-Notch1** mice exhibited improved blood flow recovery at 1 and 3 days after surgery, but differences in perfusion were not seen after 7 or 14 days. Other results are pending at the time of writing this abstract.

Conclusions: Our findings suggest that enhanced blood flow recovery following ischemia in *BMX-Notch1** mice are found at early time points after hind limb ischemia is induced, but that improved blood flow does not extend to later time points. Investigations into the mechanism behind this observation are ongoing.

Title: Perinatal Liver Inflammation Leads to Persistent Activation of Hematopoietic Progenitors through the CXCR3-CXCL10 Axis

Authors: Suruthi Baskaran MBBS, MS, Anas Alkhani MBBS, and Amar Nijagal MD

Introduction: Biliary atresia (BA) is a leading cause of chronic liver failure in infants. Despite effective surgical drainage, patients with BA exhibit attenuated immune responses to childhood vaccines, indicating persistent alterations to immune function. We previously established the role of neonatal myeloid progenitors in the propagation of perinatal liver inflammation (PLI). We currently hypothesize that PLI leads to long-term changes to the common myeloid progenitors (CMPs) through the involvement of the proinflammatory CXCR3-CXCL10 pathway.

Methods: Newborn mice were injected intraperitoneally with Rhesus Rotavirus (RRV) or control (Phosphate Buffered Saline, PBS). Serum was collected 3 days (P3: PBS n=2, RRV n=2) after infection, and from 8-12-week-old RRV-recovered adult mice (PBS n=5, RRV n=4) for Luminex multiplex cytokine assay. Neonatal liver (P3: PBS n=2, RRV n=4) was collected for flow cytometric analysis of CXCR3 expression on CMPs. Bulk RNA sequencing was performed on CMPs from the bone marrow of RRV-recovered adult mice (PBS n=2, RRV n=3). Statistical significance was calculated using Student's t-test with a p-value <0.05 considered significant.

Results: The percentage of CXCR3 expression in Flt3- CMPs was significantly higher in neonatal RRV-infected livers (p=0.02, **Figure 1a**). Similarly, CXCR3 expression of CMPs on bulk RNA sequencing was higher in RRV-recovered animals (**Figure 1b**). Further, the levels of pro-inflammatory cytokine CXCL10 were higher in P3 RRV-infected animals, though not statistically significant (**Figure 1c**). Likewise, RRV-recovered animals demonstrated significantly higher levels of CXCL10 (p=0.03, **Figure 1d**).

Conclusion: RRV-induced PLI leads to persistent activation of CMPs through the involvement of CXCR3-CXCL10 axis. This suggests that the CXCR3-CXCL10 axis may mediate the altered immune functions observed in BA.

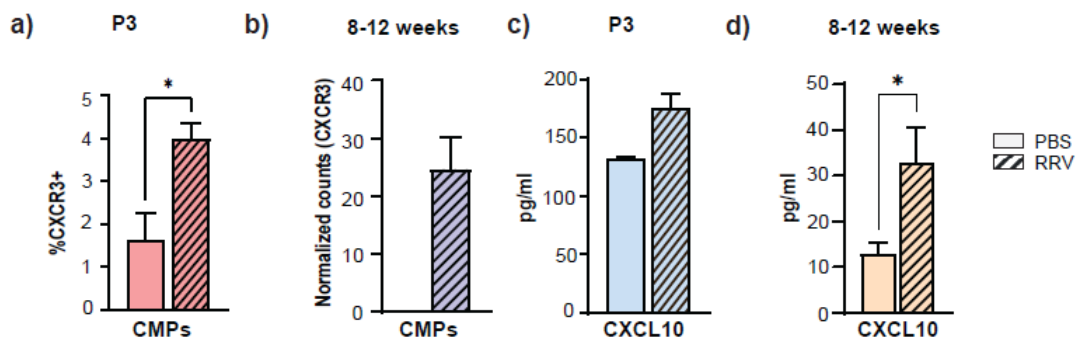


Figure 1: **a)** Percentage of CXCR3 expression in Flt3- CMPs was significantly higher in the liver of P3 RRV-infected animals, compared to controls (p=0.02). **b)** CMPs in the bone marrow of RRV-recovered animals had higher normalized counts for CXCR3 expression compared to controls. **c)** The levels of pro-inflammatory cytokine CXCL10 were higher in P3 RRV-infected animals compared to controls, though not statistically significant. **d)** RRV-recovered animals demonstrated a significant elevation of CXCL10 levels compared to controls (p=0.03) p-value <0.05 (*). Error bars: mean ± SEM.

Title: Co-Localization of Tumor Associated Macrophages and Regulatory T Cells May Signify the Presence of Immunoregulatory Niches in Human Hepatoblastoma

Authors: Mahati Kotamraju, Phoebe N Miller MD MS, Jarish Cohen MD PhD, Soo-Jin Cho MD PhD, Amar Nijagal MD

Introduction: Hepatoblastoma (HB) is the most common primary liver cancer in infants and children. The contributions of immune cells located in the tumor microenvironment of HB remain unknown. We analyzed human HB tumor specimens and identified a distinct population of tumor associated macrophages (TAMs) that express an immunosuppressive gene profile. We hypothesize that TAMs co-localize with regulatory T-cells (Tregs) to establish an immunoregulatory environment that promotes HB formation.

Methods: We used immunohistochemistry to identify CD68+ TAMs and CD4+FoxP3+ Tregs in six HB tumors and adjacent normal liver. Aperio Imagescope was used to annotate sections and identify clusters of TAMs and Tregs. We identified the percentage of TAM and Treg clusters that co-localized. Student's t-test was used to compare groups and chi-test was used to compare percentages. P-value < 0.05 were considered significant.

Results: We identified 103 distinct clusters in HB tumor specimens; 33% (34/103) were TAMs and 67% (69/103) were Tregs (a). No TAM or Treg clusters were identified in normal liver tissue. TAM clusters were composed of more cells and were bigger in size compared to Treg clusters (b,c). We identified a total of 8 instances where TAM and Treg clusters overlapped. A significantly higher proportion of TAMs co-localized with Tregs (24.0%) compared to Tregs with TAMs (12.0%) (d).

Conclusions: Clusters of TAMs and Tregs are found in human HB tissue and not normal liver. Several areas of overlap exist, suggestive that immunoregulatory populations may establish niches to suppress immune mediated anti-tumor responses and promote HB.

Figure 1:

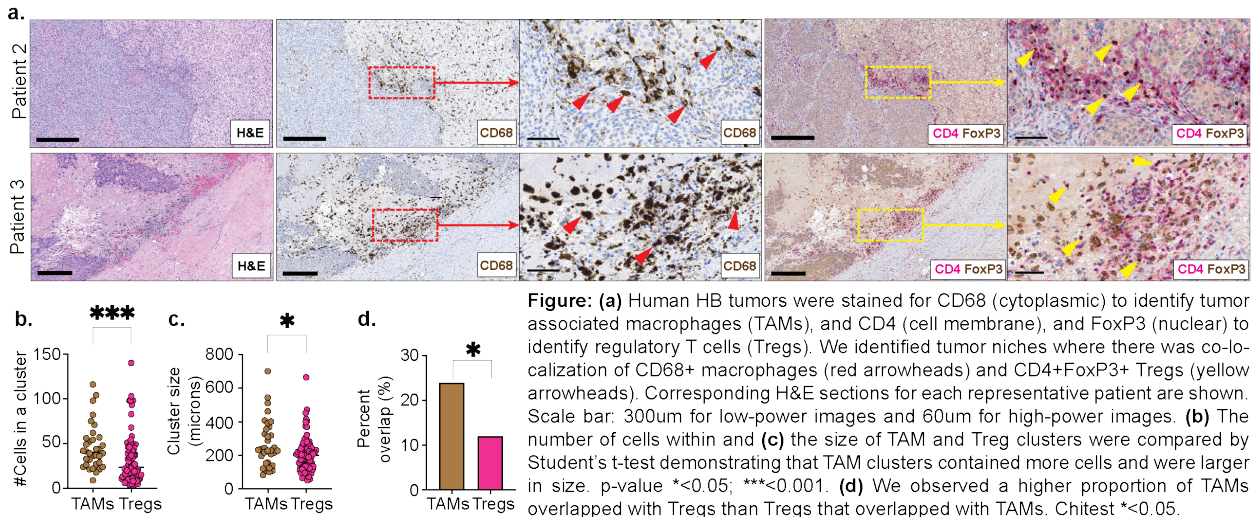


Figure: (a) Human HB tumors were stained for CD68 (cytoplasmic) to identify tumor associated macrophages (TAMs), and CD4 (cell membrane), and FoxP3 (nuclear) to identify regulatory T cells (Tregs). We identified tumor niches where there was co-localization of CD68+ macrophages (red arrowheads) and CD4+FoxP3+ Tregs (yellow arrowheads). Corresponding H&E sections for each representative patient are shown. Scale bar: 300µm for low-power images and 60µm for high-power images. (b) The number of cells within and (c) the size of TAM and Treg clusters were compared by Student's t-test demonstrating that TAM clusters contained more cells and were larger in size. p-value * < 0.05; *** < 0.001. (d) We observed a higher proportion of TAMs overlapped with Tregs than Tregs that overlapped with TAMs. Chitest * < 0.05.

Development of an Autonomous Platform for Tissue Culture and Storage in Low Earth Orbit

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Introduction: Human induced pluripotent stem cell-derived liver organoids generated in simulated microgravity conditions demonstrate improved hepatic specific characteristics compared to organoids generated by conventional methods that rely on Matrigel. Low Earth orbit (LEO) provides a sustained high-quality microgravity environment that may promote self-assembly of large complex vascularized tissues not achievable by existing tissue engineering approaches on Earth. Isochoric supercooling is a promising technology that enables stable cryopreservation of tissues in subzero temperatures without damaging effects of ice formation. We are creating a tissue culture device for complex three-dimensional (3D) tissue culture and cryopreservation aboard the International Space Station (ISS) to facilitate the utilization of tissues manufactured in LEO for biomedical applications on Earth.

Methods: We apply a parallel design strategy to develop a platform capable of complex 3D tissue culture in microgravity and stable isochoric supercooling preservation. The combined functionalities of tissue engineering and supercooling will be tested onboard the ISS.

Results: We identified Engineering design milestones and Biocompatibility milestones. A key Engineering design milestone is developing the platform's ability to transition from a perfused tissue culture system to a confined constant volume system during supercooling. Key Biocompatibility milestones include the selection and testing of materials that satisfy both tissue culture and isochoric supercooling requirements.

Conclusions:

We are constructing a tissue culture system that will perform complex 3D tissue self-assembly and isochoric supercooling preservation onboard the ISS. This innovation will expand the biomanufacturing capabilities of LEO to produce tissue engineered products that benefit biomedical applications on Earth.

Title: Utilization of Dermal Regeneration Templates in the Surgical Management of Hidradenitis Suppurativa: A Systematic Review

Author(s): Nia Buckner, MS 1; Alec Simoni, BS 2; Cameron Ward, BS 3; Casey Tompkins-Rhoades, MD 4; Alap U. Patel MD 4; Scott Hansen, MD 4

1 University of Pittsburgh, School of Medicine

2 The University of Arizona College of Medicine - Phoenix

3 California Northstate University, College of Medicine

4 University of California San Francisco, Department of Surgery, Division of Plastic & Reconstructive Surgery

Introduction:

Hidradenitis suppurativa (HS) is a chronic inflammatory disease characterized by painful abscesses and sinus tracts. Common surgical interventions range from incision and drainage to reconstruction with split-thickness skin grafts. However, effects of using dermal regeneration templates (DRTs) in HS has yet to be explored. The aims of this study are to examine the use of DRTs in surgical management of HS, and their impact on reduction in healing time, functional and cosmetic satisfaction, improved wound closure, and quality of life.

Methods:

A systematic search of Pubmed, Web of Science, and Embase was performed using terms related to use of DRTs in HS surgical management. Articles were screened for eligibility; studies were excluded if DRTs were not used during reconstructive procedure.

Results:

29 articles were found; 8 meeting inclusion criteria including 101 patients and 122 HS sites. Various DRTs were used, including but not limited to: acellular dermal matrix (n=20, 19.8%) and bilayered biosynthetic dressing (n=12, 11.88%). DRTs improved flap healing and aesthetics secondary to increased scar tissue elasticity. Some authors reported excellent postoperative passive and active range of motion (ROM) at reconstructed sites, and significantly decreased patient-reported pain scores. Only 1 of the 122 lesions presented with HS recurrence. The success of DRTs may be due to their ability to minimize dead space.

Conclusions:

These findings highlight an innovative approach to enhance outcomes through improvement in ROM, healing time, pain, aesthetics, and limited recurrence of disease. A future study should compare HS lesions treated with DRTs to traditional methods.

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The representation of racial and ethnic groups in surgical randomized trials

Ali B. Abbasi MD, Alejandro Botello BA, Alan Zambeli-Ljepovic MD, Misha Pakvasa MD, Laura Esserman MD MBA

Introduction: Diversity of racial and ethnic groups in clinical trials is important to ensure results are generalizable in settings where social determinants, the legacy of structural racism, and implicit bias can influence patient experience and outcomes. Here, we investigate the representation of minoritized racial and ethnic groups in randomized controlled trials (RCTs) published in high-impact surgical journals.

Methods: We identified US-based RCTs published between 2014-2022 in JAMA Surgery, Annals of Surgery, Journal of the American College of Surgeons, The American Journal of Surgery, Surgery, and RCTs tagged with “surgery” in JAMA, The New England Journal of Medicine, The Lancet. We extracted the number of patients, stratified by race/ethnicity and funding source. We analyzed the percent of subjects in each racial/ethnic group amongst trials that reported this information.

Results: Of 33,412 screened articles, 178 met our inclusion criteria. Race or ethnicity was reported in 97 (54.5%) and 35 (19.7%) of trials respectively. Amongst trials where the group was listed, 5.2% of patients were Asian/Pacific Islander, 13.3% Black, 18.5% Hispanic, and 77.6% White. Industry-funded RCTs enrolled more White patients (83% vs. 72% $p<0.01$) and fewer Black patients (12.7% vs. 13.7%, $p=0.004$).

Conclusions: Only half of major surgical RCTs report race/ethnicity. Amongst those that do, the representation approximates the US population, but industry sponsored trials are less diverse than non-industry sponsored trials. The FDA requires drug trials to create a diversity plan, but no such requirement exists for surgical trials. A similar strategy could be applied to surgical RCTs to ensure inclusive enrollment.

Table: Representation of racial/ethnic groups in surgical randomized trials, stratified by industry funding. ‡ Number in racial ethnic group / Number of patients in trials where this group is reported (%) Chi-Squared test industry vs. no industry* $p<0.05$ ** $p<0.01$ *** $p<0.001$

Race/Ethnicity	Trials Reporting	All Trials‡	No Industry Funding‡	Any Industry Funding‡
Asian/Pacific Islander	37	1,061/20,496 (5.2)	652/11,575 (5.6)	409/8,921 (4.6)***
Black	77	4,928/37,044 (13.3)	2,976/21,664 (13.7)	1,952/15,380 (12.7)**
Hispanic	36	3,209/17,310 (18.5)	2,329/12,569 (18.5)	880/4,741 (18.6)
White	92	39,259/50,595 (77.6)	17,977/24,959 (72)	21,282/25,636 (83)***

The Implementation and Evaluation of a National Trauma Informed Care Curriculum Pilot: A Single-Center Experience

Authors: Jonathan Freise, Adrienne Greer, Marianna Salvatori, Lara Chehab, Marissa A. Boeck, Amanda Sammann

Introduction: The American College of Surgeons (ACS) developed a trauma informed care (TIC) curriculum for hospital staff/providers to be piloted nationally. The curriculum consists of 4 hours of content, including didactic material, interactive case vignettes, a discussion of vicarious trauma with mental health professionals, and a dialogue with a lived experience expert. This study aimed to implement the pilot and evaluate opportunities for improvement at our single pilot site, a Level 1 trauma center.

Methods: This was a qualitative descriptive case study. The curriculum was piloted at our site from July-September 2023. Course participants included nurses, physicians, and others. The course was delivered in two 2-hour sessions. Interview subjects were recruited and sampled to represent diverse demographics and clinical specialties. One-hour semi-structured interviews were conducted and analyzed using a general inductive approach to thematic analysis to evaluate course experience and identify areas for improvement.

Results: 116 participants completed Part 1 of the course while 68 (58.6%) completed Parts 1 and 2. We interviewed 18 subjects (11 course instructors and 7 participants). Thematic analysis revealed 18 codes, which were consolidated into 3 themes: (1) TIC is poorly defined and protocolized leading to variable practice, (2) Empathy can be a motivator or deterrent to engage in TIC, (3) TIC sustainability requires hospital system investment in cultural and structural changes.

Conclusion: This single-center experience aims to identify opportunities for improved TIC implementation. Next, we will leverage human-centered design to redesign the curriculum to address our findings and disseminate design principles for national use.

Using Human Centered Design (HCD) to Develop Prototypes to Improve the Discharge of Unhoused Hand Infection Patients

Alap U. Patel MD^{1,2}, Marianna Salvatore MS², Lara Chehab MPH², Mica Rosser MD^{1,2}, Scott L Hansen MD^{1,2}, Amanda Sammann MD, MPH^{2,3}

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Introduction

Hand infections in EDs often necessitate hand surgery specialist consultation for proper management, posing immediate morbidity risks if untreated, especially among vulnerable populations. Research targeting improved care for such groups, notably the San Francisco homeless estimated at 20,000 yearly, is deficient (1-4). Employing human-centered design (HCD) with focus on the ideation phase, our team identified care barriers and developed prototypes during discharge to address patient and provider needs, reduce inequities, and improve interventions (Figure 1).

Methods, Results, and Progress

In the first round of qualitative interviews, using version 1 of our prototyping workbook, we gathered feedback to enhance hand infection patient care. Specifically, feedback was obtained on four prototypes: "Discharge Booklet," "Direct Observed Treatment and Wound Care Prior to Discharge," "Discharge Toolkit," and "Intake Assessment of Environment." After eight interviews and analysis, we updated our workbook to version two. Based on qualitative data, we focused on the discharge toolkit and guide due to their popularity. We created a discharge notecard with essential information, including key contacts, wound care instructions, follow-up details, and patient precautions, along with a hospital map on the back. This design was inspired by interviewees' preference for a pocket-sized format and suggestions from initial interviews. We also categorized toolkit items, allowing interviewees to choose three from each category, and addressed assembly responsibilities based on initial interview feedback.

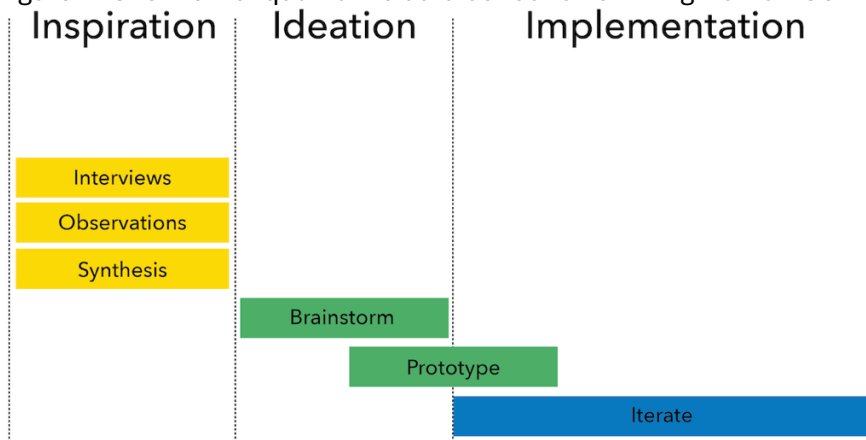
Conclusion

Human-centered design proved effective in designing interventions to improve hand infection patient care, particularly focusing on discharge procedures. Short, tailored discharge materials and a toolkit with wound care supplies were identified as effective measures. Next steps involve pilot testing these interventions to maximize patient benefit.

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Figure 1: Overview of qualitative data collection utilizing Human Centered Design (HCD).



Intravascular volume assessment with novel 4D volumetric M-Mode ultrasound technique in trauma patients

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Introduction: Current ultrasound methods for volume assessment suffer from intra- and inter-operator variability. We have developed a novel 4-dimensional (4D) volumetric M-mode (VMM) ultrasound (US) technique, which expands the spatial coverage of M-mode scanning by including lateral image direction, to assess intravascular volume by monitoring the major veins like the inferior vena cava (IVC). The VMM technique aims to address current point of care ultrasound (POCUS) limitations, aiding in early detection of hypovolemia/hemorrhage and guiding resuscitation.

Methods: This single institution study will be completed in a staged approach and includes level 1 trauma patients between the ages of 18-45. The first stage of the study will correlate large vessel (IVC, jugular vein, and femoral vein) diameter and collapsibility index measured by physicians using POCUS versus VMM. The second stage of our study will use as its primary predictor IVC collapsibility index as measured by VMM longitudinally over the first 24 hours after admission. The primary outcome will be stage of shock. Secondary outcomes include vital signs, volume of blood product/crystalloid resuscitation, serum hematocrit, and serum base deficit.

Results or Progress: A detailed protocol has been approved by the IRB at Highland Hospital. Waiver for consent/authorization by IRB was obtained, as this protocol will not change clinical decisions or patient management.

Conclusion: The next steps for our study are protocol refinement and data acquisition to begin Fall 2024. We plan on obtaining 15-20 patients for the first stage of the study and 50-100 patients for the second stage.

Is Interval Repeat Computed Tomography Angiography for Grade 1 Blunt Cerebrovascular Injuries Cost-Effective?

Authors: Cynthia J. Susai, MD, Nathan J. Alcasid, MD, April E. Mendoza, MD, Gregory P. Victorino, MD

Background:

For all blunt cerebrovascular injuries (BCVI), the standard recommendation is to obtain follow up imaging, usually computed tomography angiography (CTA), to evaluate for change in approximately 7-10 days post injury. However, given a low stroke rate and primarily medical management in grade I blunt cerebrovascular injuries, we hypothesized that repeat CTA in this subset of BCVI would not be cost-effective.

Methods: We performed a decision-analytic model to evaluate to cost-effectiveness of follow-up CTA at 7-10 days for asymptomatic grade I BCVI on antithrombotic therapy. Cost, probability estimates, and utilities were taken from published literature. Deterministic analyses were performed.

Results: Decision-analytic model identified that repeating CTA after initial diagnosis of BCVI was the optimal strategy, with higher effectiveness offsetting a slightly higher cost. Although the strategy of repeating a CTA had a net increased cost of 694.20, the utility is significantly better, with QALYS of 0.94 versus 0.86 without a repeat CTA. Deterministic sensitivity analysis revealed the variables most influential in determining the optimal strategy in descending order include cost of CTA, utility of unnecessary antithrombotic treatment after resolved BCVI, cost of antithrombotic therapy, and utility of endovascular intervention reducing stroke risk.

Conclusion: In patients with asymptomatic grade I BCVI, repeating CTA for grade I BCVI is overall cost-effective. The improvement in QALYs from stopping antithrombotic therapy and stroke reduction is substantial enough to compensate for a slightly higher cost. This supports repeating the CTA as the cost-effective management strategy for asymptomatic grade I BCVI.

Oncologic Safety of Immediate Oncoplastic Surgery Compared to Standard Breast Conserving Surgery for Patients with Invasive Lobular Carcinoma

Israel Falade¹, Kayla Switalla^{2,3}, Astrid Quirarte³, Molly Baxter³, Daniel Soroudi¹, Harriet Rothschild¹, Shoko Emily Abe³, Karen Goodwin³, Merisa Piper⁴, Jasmine Wong³, Robert Foster⁴, Rita A Mukhtar³

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Abstract:

Background: Invasive lobular carcinoma (ILC) of the breast grows in a diffuse pattern, resulting in high risk of positive margins at surgical resection. Oncoplastic approaches have been shown to reduce this risk, but there are persistent concerns around the safety of immediate oncoplastic surgery for those with ILC. This study evaluates the short and long-term oncologic outcomes for immediate oncoplastic surgery in patients with ILC.

Methods: We retrospectively analyzed an institutional database of stage I-III ILC patients who underwent breast-conserving surgery (BCS) with or without immediate oncoplastic surgery (oncoplastic closure or oncoplastic reduction mammoplasty [ORM]). We compared positive margin rates, rates of successful BCS, and recurrence-free survival (RFS) by type of surgery.

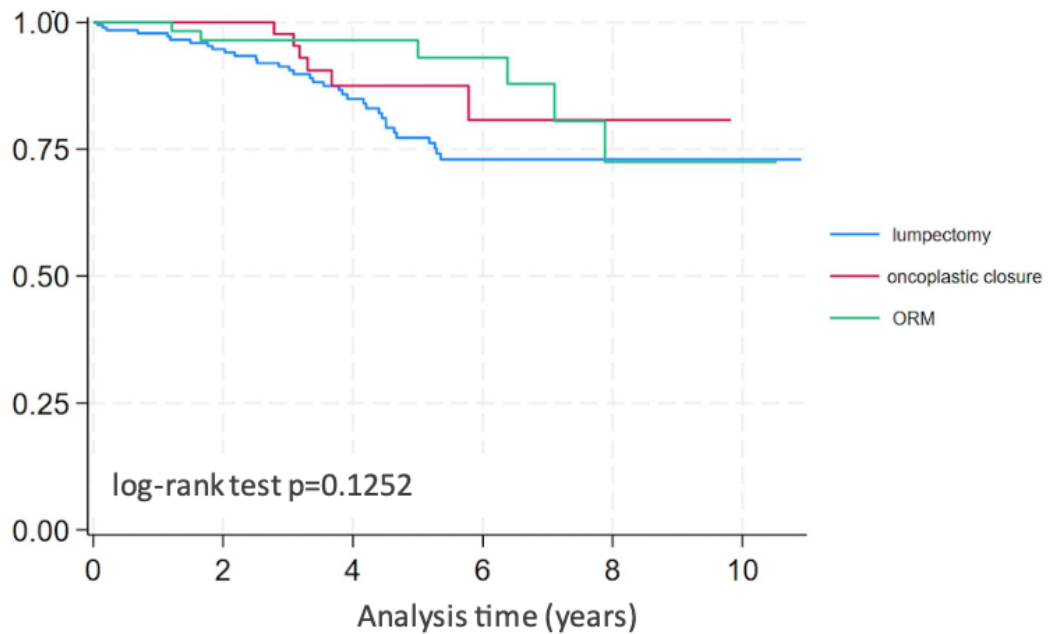
Results: In 494 patients, we found that the use of immediate ORM was associated with significantly lower odds of positive margins (odds ratio [OR] 0.3, confidence interval [CI] 0.1-0.5, $p < 0.001$). Both lumpectomy with oncoplastic closure and ORM were significantly associated with higher rates of

successful BCS compared to standard lumpectomy (94.2%, 87.8%, and 73.9% respectively, $p < 0.001$).

There was no difference in RFS in those undergoing immediate oncoplastic surgery compared to standard lumpectomy alone.

Conclusions: Patients with stage I-III ILC who underwent immediate oncoplastic surgery had significant benefits including lower odds of positive margins, higher rates of successful BCS, and both types of immediate oncoplastic surgery showed similar RFS compared to lumpectomy alone. This supports the oncologic safety of immediate oncoplastic surgery in diffusely growing tumors like ILC, making it an ideal option for patients desiring BCS.

Figure 1. Kaplan-Meier recurrence-free survival curves based on initial surgical procedure performed



<u>Number at risk</u>						
Lumpectomy	191	146	97	57	31	11
Lumpectomy with oncoplastic closure	80	49	28	12	6	0
ORM	78	53	39	22	8	1

Title: Financial Toxicity in Breast Cancer Patients at a Safety-net Community Hospital

Authors: Katie Kenny, Jessica Dzubnar M.D., Cynthia Susai M.D., Ayemoethu Ma, M.D.

Introduction: Financial toxicity (FT) is the financial, emotional, and physical distress associated with the direct and indirect costs of treatment. We hypothesize that breast cancer patients at a safety-net hospital will experience high financial toxicity, which may correlate with low quality of life (QL).

Methods: We are surveying consecutive patients aged ≥ 18 years at breast and infusion clinic appointments who received a new breast cancer treatment within 18 months of recruitment date. Patients who agree to participate will complete three surveys at their clinic visit: a general questionnaire, Comprehensive Score for Financial Toxicity (COST) and Functional Assessment for Cancer Therapy (FACT-B). COST and FACT-B have been validated to assess financial toxicity and quality of life, respectively. Demographic and clinical data regarding patients' breast cancer treatment will be obtained from a review of electronic health records.

Preliminary Results: In the preliminary data (n=47), 53% of patients are experiencing FT, as defined by a COST score of ≤ 17.5 . Using a two-sample t-test, we found that patients with FT have a statistically significant ($p=0.000523$) lower QL score on FACT-B. Lowest FACT-B scores were noted in the functional well-being subcategory after initiation of treatment (Table 1).

Conclusion: Initial data indicates that FT is associated with lower QL. Recruitment of patients will continue until we reach our desired pilot sample size of 150 patients.

Table 1. Comparison of Mean and Median FACT-B and COST Survey Scores.

	Mean			Median		
	w/ FT (n=25)	w/o FT (n=22)	Total (n=47)	w/ FT (n=25)	w/o FT (n=22)	Total (n=47)
Total COST Score (0-44)	11.4	28.2	19.2	12	27	16.5
Total FACT-B Score (0-148)	85.6	109.7	96.9	89.3	109.4	98.4
Physical well-being subscore (0-28)	15.8	22.8	19	17	22.5	20
Social well-being subscore (0-24)	18.4	22.4	20.2	18.7	23.7	21
Emotional well-being subscore (0-24)	14.6	18.4	16.4	15	19	17
Functional well-being subscore (0-28)	13.9	17	15.3	12	17.1	16.3
Breast Cancer Subscale subscore (0-40)	23	29.2	26	23	29	26

Note: Lower COST scores indicate worse financial toxicity. Lower FACT-B indicate worse quality of life.

Utility of Drains in Abdominal Wall Reconstruction: Outcomes and Best Practices

Mitchell R. Koss, Alap Patel, Angelica McDaniel, Waverley He, Zuivanna Rivas, Matthew Lin, Scott Hansen

Introduction: Diligent post-operative care following open abdominal wall reconstruction is necessary for a satisfactory outcome. Subcutaneous drains are reported as being a contributing factor to length of hospitalization and surgical outcomes; however, there exist no clear criteria for drain placement and removal. The purpose of our study was to determine whether or not the use of subcutaneous drains helped decrease the incidence of post-operative seroma, hematoma, infection, or wound dehiscence.

Methods: A retrospective cohort study examined drain practices and outcomes for 32 patients (25 with drains, 7 without drains) undergoing abdominal wall reconstruction at a single academic medical center. Data collected included duration of drain placement, criteria for removal, and outcomes.

Results: Our cohort of 32 patients was 56% male, 44% female, and had an average age of 63 years. Jackson Pratt or penrose drains of varying sizes were placed in the subcutaneous layer. One to four drains were placed. Seroma incidence and infection incidence were found to be 16% for the drain placement group and 14% for the no drain placement group. There was no wound dehiscence. Patients received drain teaching from inpatient bedside nurses to ensure adequate home care and showering. Drains were removed when output was 30 cc or less for three consecutive days.

Conclusion: Drain practices for complex open abdominal wall reconstruction produce similar outcomes to patients without drains, and more work is needed to reveal potential differences. Importantly, patients can go home with drains if they are properly educated on how to care for them.

Title: Machine Learning Improves Post-Transplantation Hepatocellular Carcinoma Recurrence Prediction

Authors: Jonathan Li, BA, Amir Ashraf Ganjouei, MD, MPH, Shareef Syed, MBChB, MRCS, Neil Mehta, MD, Adnan Alseidi, MD, EdM, Mohamed A. Adam, MD

Introduction: We evaluated whether machine learning (ML) algorithms and additional novel risk factors could improve post-transplantation hepatocellular carcinoma (HCC) recurrence prediction.

Methods: Using the UNOS database, we identified HCC patients who underwent liver transplantation (2015-2018) and considered >50 available clinical, radiographic, laboratory/biomarker, and explant pathology variables to predict post-transplantation recurrence. The cohort was split 70:30 into training and test datasets. Recursive feature elimination was employed to select an optimal number of variables for each candidate ML model. Final model performance was compared to clinically used tools on the test dataset.

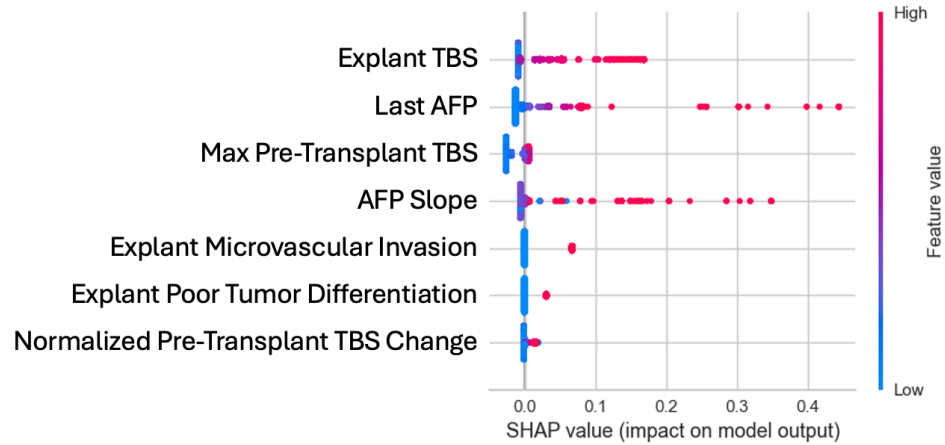
Results: Of the 3106 patients identified, 7.2% developed post-transplantation HCC recurrence. The Gradient Boosting Survival algorithm performed best (C-index: 0.73) and included 7 variables: explant tumor burden score (TBS), AFP at transplantation, maximum pre-transplantation TBS, pre-transplantation AFP slope, microvascular invasion on explant, poor tumor differentiation on explant, and change in pre-transplantation TBS normalized by the number of locoregional therapy received. This outperformed the RETREAT Score (C-Index 0.70). A Random Survival Forest model including only pre-operative variables (AFP at transplantation, pre-transplantation AFP Slope, change in AFP from listing to transplantation, maximum pre-transplantation TBS, and change in ALBI Grade from listing to transplantation) was also able to predict recurrence (C-Index 0.69).

Conclusion: We created a novel ML model that performs better than an existing, widely used risk score and can potentially be used to better risk stratify patients following transplantation and tailor surveillance/adjunct therapy. The pre-transplantation model may be used with the Milan Criteria to further risk stratify patients being considered for transplantation.

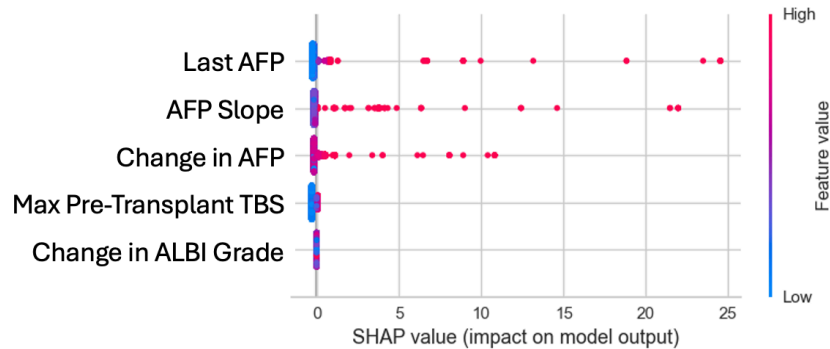
Figure: Feature Importance Visualization for Final ML Models

SHAP values were calculated and plotted for the final full ML model (A) and final pre-transplant ML model (B). For each plot, model variables are ordered by importance on the y-axis (top – most important; bottom – least important). Variable impact is visualized on the X-axis. Larger SHAP value signifies greater weight in model prediction. Red signifies larger values for the specific variable.

A. SHAP Summary Plot for Final (Gradient Boosting Survival, 7 Variable) Full ML Model



B. SHAP Summary Plot for Final (Random Survival Forest, 5 Variable) Pre-Transplant ML Model



Pain Management in Abdominal Wall Reconstruction: The Association between TAP Blocks and Narcotic Prescription at Time of Discharge

Authors: Angelica McDaniel, BS; Alap U. Patel, MD; Mitchell Koss, BS; Zuivanna Rivas, BS; Waverley He, MD; Matthew Lin, MD; Scott L. Hansen, MD

Introduction:

Tranversus abdominis plane (TAP) blocks are regional blocks used for pain management during and after abdominal surgeries. However, criteria regarding appropriate TAP block utilization is unclear. This study sought to assess associations between TAP block administration and opioid prescription patterns following abdominal wall reconstruction.

Methods:

A retrospective cohort study identified patients who underwent abdominal wall reconstruction at a single academic medical center. Options for pain management included TAP blocks, epidural, or our standard of care (oral and intravenous pain drugs, including narcotics). Data regarding patterns of epidural administration and opioid prescription at discharge was collected and analyzed.

Results:

1589 patients underwent abdominal wall reconstruction from 2012 to 2023. Amongst these patients, 12 (<1%) received a TAP block while 1577 (>99%) received oral and IV pain medications and/or an epidural. All patients who received TAP blocks were also prescribed opioids at discharge, which was similar to opioid prescriptions for the control group that did not receive a TAP block.

Conclusions:

We hypothesized that TAP block utilization may limit the number of prescribed oral narcotics at discharge; however, at our institution, every patient who received a TAP block was also prescribed oral narcotics. This may be due to individual provider practice or significant ongoing pain associated with the surgery. From this, we have learned that TAP block administration in abdominal reconstruction surgeries does not change the rate of opioid prescription at discharge. Further analyses will focus on inpatient opioid use and TAP block effectiveness beyond abdominal wall reconstruction.

Hospital Experience by Language Proficiency: A Qualitative Study of Older Adults

Kelsey Ogomori, Julia Axelrod, Emily Finlayson, MD MS, Daniel Dohan, PhD, Tasce Bongiovanni, MD MPP MHS

Introduction: Older adults have increased risk of adverse outcomes after traumatic injury or emergency general surgery (EGS), as do Limited English Proficient (LEP) patients; the intersection of these identities may pose unique risks, though literature is lacking. We aimed to understand the experience of older patients admitted for trauma or EGS and possible differences based on language, using qualitative methods.

Methods: At a safety-net, level one trauma center, we purposively sampled inpatients from the trauma/EGS service who were aged ≥ 65 with mild or no cognitive impairment. We conducted semi-structured interviews, including family (when present), using interpreters for self-reported LEP patients. Analysis is in-progress, coding interview transcripts using Grounded Theory methods and triple-coding 20% of interviews for concordance.

Results: We have enrolled 22 participants, 8 LEP. Participants' primary languages were English (n=14), Spanish (n=5), Cantonese (n=2), and Russian (n=1). Both the English and LEP cohorts included diverse racial identities (White, Black, Asian, Native American, and "Other,") and had participants of Hispanic or Latinx origin. Four themes emerged in analysis to date (Table 1).

Table 1: Emerging Themes with Sample Quotations

Theme	Definition	Quotations
Quality Nursing	Both LEP and EP participants reported high quality nursing staff that were caring, skilled, and responsive.	<p>"These people [nurses] are absolutely gorgeous. They just take care of you. As soon as you push your button, they're here. They couldn't get here any quicker...They come in right away" -EP Patient</p> <p>"The nurses are very good, they are very caring and they will ask me if anything I need, things like that" -LEP Patient</p>
Lack of Information	Both LEP and EP participants expressed not knowing who their physicians were, having minimal time with physicians, and not understanding their care plan.	<p>"The doctors, I don't know, there have been so many. And each team has three or four doctors, so I really don't feel like I've had much connection...It was a little confusing because there was like several teams working on me...we had like three sets of teams telling me one thing and the other team saying, 'no, no, we're not going to do that.'" -EP Patient</p> <p>"The nurse informed me today that I can be discharged. But I am not sure whether it is true." -LEP Patient</p>
Trust	Both LEP and EP patients shared that they felt a need to trust their medical team due to their lack of knowledge as non-medical professionals.	<p>"I don't have a background or knowledge of the intricacies of medicine...And I'm not going to act like I do. I'm looking to them for guidance" EP Patient</p> <p>"Enough. They told me enough. They told me enough, I was just surprised that this had to be done more urgently than I expected...In my opinion, they did their best." -LEP Patient</p>
Advocacy	EP patients and family members of LEP patients, but not LEP patients, had criticisms of their hospital experiences and examples of times they voiced their needs and preferences regarding care and care planning.	<p>"Every nurse is hooking this thing up a little bit differently...And so I've been telling them, 'Here's how the other nurse hooked it up.'" EP Patient</p> <p>"When I came, I found her like with her head rolled down like she was all bunched up there. It's important to make them comfortable that way they're not in pain...I'm not happy...they should have pulled her up a little bit."-LEP Family Member</p>

Conclusion: Analysis to date found that EP participants and LEP family members were more willing than LEP participants to critique their hospital experience; EP participants with other vulnerable identities did not withhold criticism, indicating language may independently affect disclosure and/or patient experience. While critical feedback and self-advocacy were noticeably absent from LEP participants' interviews, we have no reason to believe LEP participants have better hospital experiences; rather this difference suggests that communication barriers exist despite widespread interpreter availability.

Evaluating Plastic and Reconstructive Surgery Programs' Involvement in Diversity, Equity, and Inclusion

Chris Perez, BS, Alap U. Patel, MD, Scott Hansen, MD

Introduction: The Accreditation Council for Graduate Medical Education and the American Society of Plastic Surgeons have affirmed the need and role of Diversity, Equity, and Inclusion (DEI) in recruiting those underrepresented in medicine. This study quantifies surgery-specific DEI committees and Plastic and Reconstructive Surgery (PRS) faculty in DEI leadership.

Methods: We identified accredited integrated Plastic Surgery residency programs using the Association of American Medical College's residency explorer tool and the American Medical Association's Fellowship and Residency Electronic Interactive Database. Eighty-seven Integrated Plastic Surgery programs and their respective Department of Surgery were reviewed for DEI statements, surgery-specific DEI committees, and PRS faculty involvement.

Results: After review, 59/86 (68.6%) PRS programs or their respective General Surgery Department included DEI verbiage on their website. Twelve (14.0%) were solely from the PRS program's website. When reviewing for DEI committees, 35 (40.7%) had a surgery-focused DEI committee. Upon further evaluation of these committees, 14 (16.2%) had a PRS faculty member, three (3.5%) were composed solely of PRS members, and four, not including the PRS-specific committees, PRS faculty were in leadership positions within these committees.

Conclusions: Although over half of PRS programs or their respective General Surgery Departments incorporate DEI language, DEI within surgery-specific committees was less prominent and even less so in PRS-specific settings. Additionally, faculty involvement in DEI shows a need for more involvement by PRS faculty and residents.

Evaluating the Efficacy of Artificial Intelligence in Hand Surgery

Daniel Soroudi BS, Alap U. Patel MD, Ryan Sadjadi MPH, Scott L. Hansen MD

Introduction: While artificial intelligence (AI) has rapidly expanded in medicine, its proficiency in addressing hand surgery-related queries remains unexplored. We aim to assess the accuracy of ChatGPT, an AI chatbot, in answering common hand surgery queries.

Methods: Utilizing Google Trends in the past five years, three top queries were selected from the following search terms: “Hand Anatomy”, “Hand Fracture”, “Hand Joint Injury”, “Hand Tumor”, and “Hand Dislocation”. These queries were input into ChatGPT-3.5. Word count and Flesch-Kincaid Grade Level were assessed from responses. The Patient Education Materials Assessment Tool (PEMAT), reported as a percentage, and the DISCERN instrument, reported on a 1-5 scale ranging from 1:‘no’ to 5:‘yes’, were used independently by two researchers. A surgeon evaluated the accuracy of the responses, using a 5-point Likert scale ranging from 1:‘completely incorrect’ to 5:‘entirely correct’. Grades were compared using 2-tailed t-tests.

Results: Fifteen total responses within five categories were analyzed and recorded (Table 1). Overall accuracy was 4.40 ± 0.63 , mean word count was 368.20 ± 57.97 , and readability was a Flesch-Kincaid Grade Level of 11.04 ± 1.37 . The PEMAT understandability was higher than the actionability (76.67 ± 6.17 vs 36.67 ± 20.40 , $p < 0.001$). Overall DISCERN reliability was 2.51 ± 0.23 , quality was 2.00 ± 0.93 , and overall score was 3.27 ± 0.83 .

Conclusion: We provide insights into AI chatbot accuracy, reliability, and understandability as related to hand surgery. Certain queries resulted in higher scores than others. This AI chatbot may assist surgeons in answering common patient questions. Further refinement in the actionability of AI-generated information is needed.

Table 1: AI Chatbot Responses to Top Searched Queries in Various Hand Surgery Topics

Measure	Hand Anatomy	Hand Fracture	Hand Joint Injury	Hand Tumor	Hand Dislocation	Overall Score
DISCERN Reliability Score	2.29 ± 0.00	2.57 ± 0.16	2.29 ± 0.00	2.76 ± 0.07	2.64 ± 0.23	2.51 ± 0.23
DISCERN Quality Score	1.05 ± 0.07	2.93 ± 0.08	2.05 ± 1.01	1.14 ± 0.16	2.86 ± 0.18	2.00 ± 0.93
DISCERN Overall Score	3.38 ± 0.98	3.67 ± 0.52	3.00 ± 0.89	2.67 ± 0.82	3.17 ± 0.41	3.27 ± 0.83
PEMAT understandability score %	77.27 ± 7.61	78.79 ± 4.69	74.24 ± 8.94	78.79 ± 4.69	74.24 ± 3.71	76.67 ± 6.17
PEMAT actionability score %	0.00 ± 0.00	60.00 ± 0.00	43.33 ± 8.16	40.00 ± 0.00	40.00 ± 0.00	36.67 ± 20.40
Accuracy	4.67 ± 0.58	4.00 ± 0.00	3.67 ± 0.58	5.00 ± 0.00	4.67 ± 0.58	4.40 ± 0.63
Flesch-Kincaid Grade Level	9.60 ± 0.94	10.94 ± 1.57	11.56 ± 1.23	10.73 ± 0.43	12.39 ± 1.28	11.04 ± 1.37
Word count	421.67 ± 67.28	375.33 ± 23.46	323.00 ± 66.43	319.67 ± 16.04	401.33 ± 34.12	368.20 ± 57.97

Meta-Analysis of Plastic Surgery Complex Groin Closures after Vascular Interventions

Jack Thiara 1, Alap Patel MD 2, Scott Hansen MD 2

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Background: Vascular groin closure surgeries often result in complications that can threaten the vascular graft. To salvage grafts, muscle flap coverage is commonly employed to introduce vascularized tissue into the wound, promoting wound healing and preventing further complications. Muscles used for flap coverage include the rectus femoris, sartorius, gracilis, etc. The purpose of this study was to conduct a literature review and meta-analysis focusing on the outcomes of groin wounds with infections and other complications after complex closure with a muscle flap.

Methods: Our institution's private database that queries 830 databases (including PubMed), was systematically searched from inception until December 2023.

Results: Twenty studies were ultimately included in our meta-analysis. Graft salvage rates were 84.67% (SMF) and 86.53% (RFF). Limb salvage rates were 93.80% (SMF), 92.55% (RFF), and 88.42% (GMF). Thirty day mortality was 4.02% (SMF) and 9.68% (RFF). The 1 year mortality rate for 5.17% (SMF) and 21.77% (RFF). The complication rate was 26.40% (SMF) and 19.81% (RFF).

Conclusion: We can conclude that the use of the sartorius or rectus femoris muscle as a flap is an effective management technique for complicated groin wounds. Both muscle flaps show similar salvage rates, but the RFF has a lower rate of overall complications. However, given the RFF's higher rates of bleeding and dehiscence, and more invasive and longer procedure, we would recommend it be reserved for higher risk cases, and that the SMF be the primary muscle flap.

What is the true prevalence of clinically relevant pancreatic cystic lesions in our society? A study of 21,651 healthy individuals with whole-body preventative MRI screening

Paul Wong BS, Tommaso Pollini MD, Marco Zampese MD, Letizia Todeschini MD, Lucas W. Thornblade MD, Mohamed A. Adam MD, Adnan Alseidi MD, MEd, FACS, Carlos U. Corvera MD, FACS, Kenzo Hirose MD, Kimberly S. Kirkwood MD, Eric K. Nakakura MD, PhD, Ajay V. Maker MD, FACS

Background

True prevalence of pancreatic cysts and risk factors for development in the general population remain unknown. Using a large sample of high-resolution MRIs from healthy individuals, patient demographics and exposures were investigated for association with incidental pancreatic cystic lesions.

Methods

Healthy participants underwent rapid whole-body imaging on commercially available 1.5T MRI for general preventative screening (Prenuvo) between 2011-2024. Scans were read by professional radiologists utilizing synoptic, standardized reporting templates, and diagnostic free-text was evaluated using natural language processing.

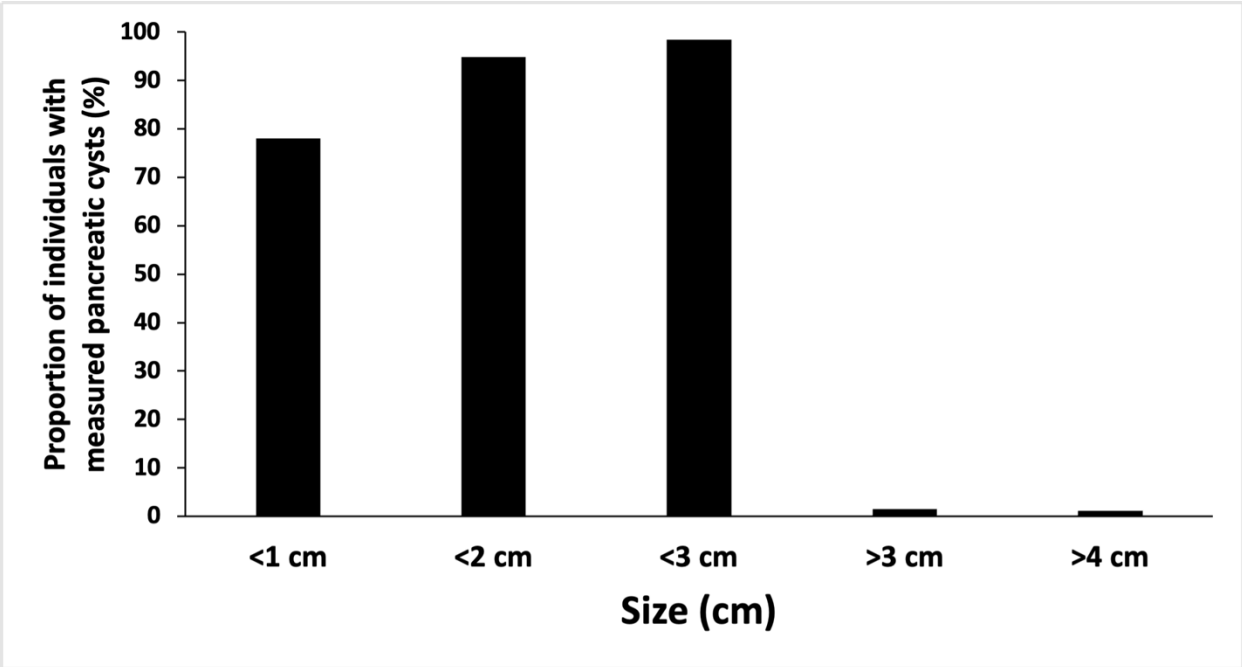
Results

Of 21,651 individuals that underwent whole-body MRI, 1,509 (7%) individuals (female 52%) had a pancreatic cystic lesion or focal pancreatic finding. Median ages of those with and without cystic lesions were 61 [IQR 51-69] and 50 [41-60], respectively. Prevalence of lesions in patients >65 years was 14%, and 5% in those <65 years ($p < 0.001$). Most (95%) measured cysts were <2cm, 78% were subcentimeter, and <2% were >3cm (0.04% of total scans). Age >65 (OR 3.92), females (OR 1.16), family PDAC history (OR 1.46), alcohol use (OR 1.21), and Latin American (OR 1.80)/Middle Eastern (OR 1.43) ethnicity (ref. Caucasians) were found to be independent predictors of lesions; Asian ethnicity (OR 0.78) was associated with decreased frequency (all $p < 0.05$). BMI, smoking history, and personal cancer history did not demonstrate any associations.

Conclusions

In a healthy cohort obtaining whole-body screening MRI, 7% have a pancreatic cyst with rare individuals having a cyst >3cm. Older age, female sex, family history of PDAC, alcohol use, and Latin American/Middle Eastern ethnicity may be associated with increased risk of cyst development.

Figure 1. Cyst size of measured pancreatic cystic lesions incidentally identified on screening MRI in a healthy population.



The Association of Housing Status Changes with Lung, Colorectal, and Breast Cancer Outcomes in a National Sample of Veterans

Hannah Decker MD, Laura A. Graham PhD, MPH, Ashley Titan MD, Mary T. Hawn MD, MPH, Hemal K. Kanzaria MD, MSc, Elizabeth Wick MD, Margot Kushel MD

Introduction

Cancer is a leading cause of death in older unhoused adults. It is not known if gaining housing after cancer diagnosis is associated with survival differences compared to remaining unhoused.

Methods

We identified Veterans diagnosed with lung, colorectal, and breast cancer from 2011-2020 nationwide and assessed housing status for the year before cancer diagnosis through the year after diagnosis, classifying Veterans as housed or unhoused each month. We used a multivariable Cox Proportional Hazard model, with housing status as a time-varying covariate, to compare hazard rates of all-cause mortality for each cancer type, adjusting for age at diagnosis, stage at diagnosis, sex, race, ethnicity, marital status, facility location, and behavioral/physical health comorbidities.

Results

We identified 108,675 Veterans, of which 5,318 (5%) were unhoused at the time of diagnosis. Of this group, 21% gained housing in the year after a cancer diagnosis (N= 1,121).

For lung and colorectal cancers, continuously unhoused Veterans had a significantly higher risk of mortality than those who were continuously housed (lung: HR 1.09, 95%CI 1.04-1.15; $p < 0.001$, colorectal: 1.22, 95% CI 1.10-1.36; $p < 0.001$). Veterans who were unhoused at diagnosis but subsequently gained housing had similar risks of all-cause mortality to those that were continuously housed (lung: adjusted HR 1.01, 95% CI 0.91-1.12; $p = 0.86$, colorectal: 0.97, 95%CI 0.81-1.16; $p = 0.72$).

Conclusions

Veterans who were unhoused at the time of cancer diagnosis but subsequently gained housing had similar rates of all-cause mortality as those who were continuously housed. Policies that promote housing may help improve cancer-related outcomes in this population.

Designing the First Trauma Surgery Fellowship for East/Central Africa: A Survey of Ugandan Residents and Faculty

Alan Zambeli-Ljepović, MD; Treasure Ibingira, MD; Caroline Stephens, MD; Marissa Boeck, MD; Doruk Ozgediz, MD; Martha Namugga, MD

Introduction

In low-income countries, local trauma surgery fellowship (TSF)-trained clinicians can help reduce injury-related mortality closer to levels observed in higher-resource settings. Success, however, hinges on buy-in from local staff. We aimed to assess clinician support for a potential first TSF for East/Central Africa, considering perceived need, curricular recommendations, barriers, and motivating factors.

Methods

After cognitive interviews with experts and questionnaire pilot testing, we cross-sectionally surveyed Ugandan faculty (general surgeons and procedural subspecialists involved in trauma care) and surgical residents at a tertiary, national referral hospital. We report respondent percentages for multiple choice answers and thematic analysis of free-text responses to an “Other Comments” prompt, using a primarily inductive approach.

Results

Among 46 faculty (13 subspecialties) and 42 resident respondents, 86% supported a Ugandan TSF. Free-text responses were concordant, revealing acute awareness of current trauma system inadequacies and conviction that a TSF would reduce mortality (Table). Respondents recommended incorporating emergency general surgery (66%), critical care (84%), and international rotations (76%) into the curriculum. Severe resource and structural deficiencies (82%) and concern about governmental support for post-training employment and compensation (66%) were leading perceived barriers to TSF implementation. Most faculty felt that a TSF would improve patient outcomes (93%), overall trainee education (77%), and clinical efficiency (68%).

Conclusions

Ugandan clinicians who care for injured patients view a TSF as crucial in improving injury-related outcomes, despite known barriers. TSF implementation should incorporate curricular recommendations from this survey and address pervasive concerns about financial and infrastructural support from the national government and local institutions.

Table. Themes and Representative Quotes from Thematic Analysis of Free-Text Responses from 22 Faculty and 25 Residents. TSF: trauma surgery fellowship.

State of Trauma Training & Patient Care	TSF Structure	Motivating Factors	Potential Barriers
“Uganda is overwhelmed with trauma, [with an] urgent need for better [triage] and emergency systems” (faculty)	TSF “should be open to all [surgical] disciplines, not only general surgery” (faculty)	“Patient survival would increase exponentially” (faculty)	“Trainees worry that the [trauma] specialty [would] not offer opportunities for lucrative private practice,” while “specialists working in public hospitals” would only receive “poor pay by government” (faculty)
Subspecialists currently caring for trauma patients “are not really interested in the trauma patient unless it involves an anatomical area of their interest” (faculty)	“Career path,” including “employment after training,” “should be clear” with recognition of the “specialty structure within the Uganda government” (faculty)	“This will be the best thing in as far as trauma care in Uganda is concerned” (faculty)	“Political will” is critical in supporting “pay structure, jobs, [and] training, or else external funding” will be necessary (faculty)
“All regional [referral centers] in Uganda are wanting in terms of trauma management” (resident)	“To get buy-in from [the ministry of health],” it should be emphasized “that [trauma specialists] should be posted in regional referral hospitals” (faculty)	TSF “is long overdue” and “should start immediately” (faculty)	Setup “at [the national referral hospital] may not be favourable for the training” (faculty)
“Advocacy for starting the fellowship at [university hospitals] in Uganda should be a priority.” (resident)	Trauma “fellowship should be accredited here in Uganda” (resident)	“Should have had this specialized training start more than 20 years ago!” (resident)	“Provide basic instruments for diagnosis” (resident)

What's the Plan? Communication and Critical Thinking in the Texting Age

Riley Brian, MD, MAEd, Jacquelyn Alexandra Knox, MD, Aileen Gozali, Brandon Cowan, MD, Patricia S. O'Sullivan, EdD, Shareef Syed, MBChB, MAEd

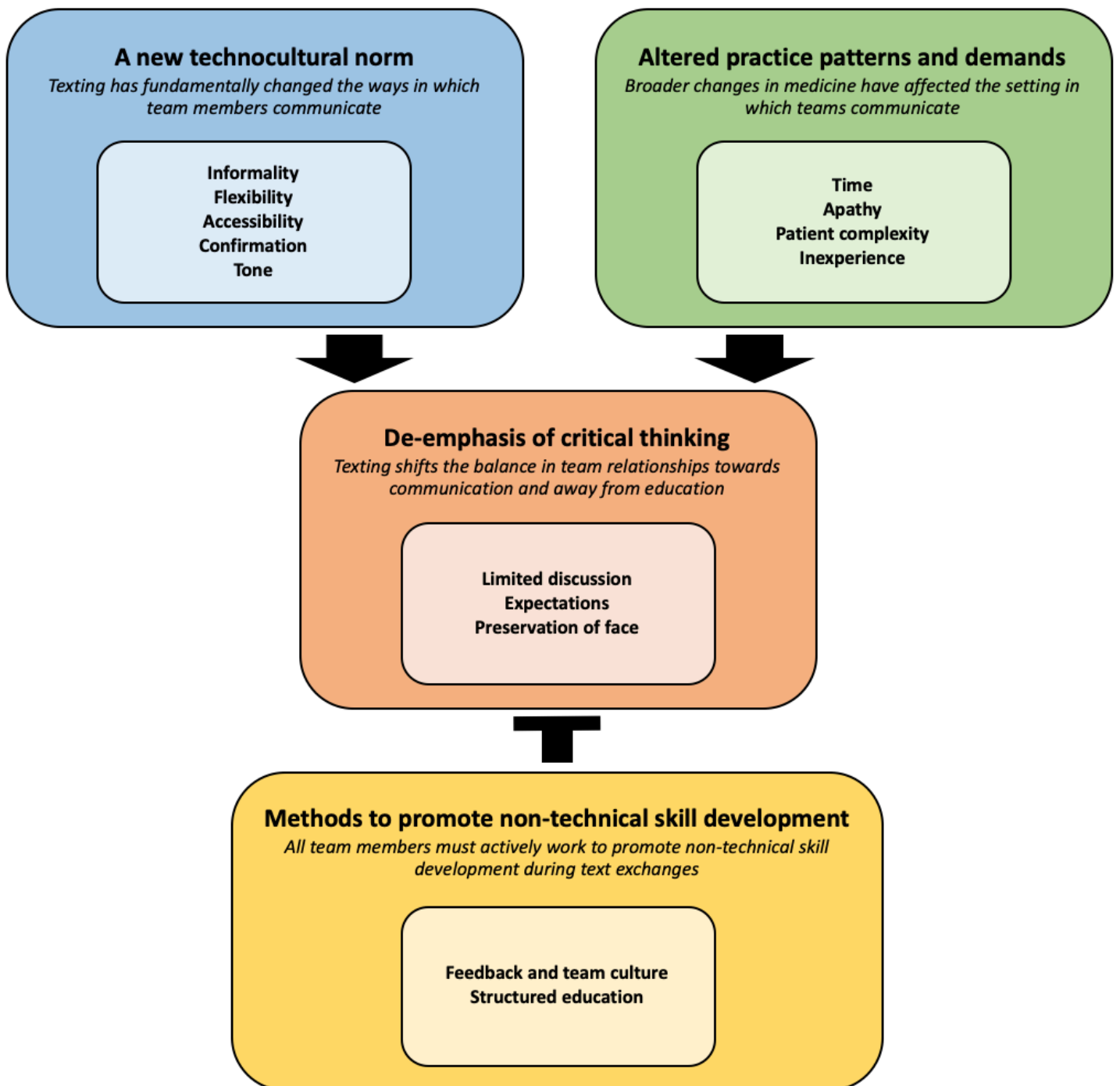
Introduction: Though texting is a preferred way for clinicians to discuss patient care, faculty in prior studies have posited that texting may detract from trainees' education. Little research has explored how texting impacts non-technical skill development, including communication and critical thinking. We aimed to identify how trainees conceptualized the effect of texting on these non-technical skills.

Methods: We performed a qualitative study in which we conducted semi-structured interviews with surgical residents to explore the relationship between texting and non-technical skills. Three authors examined anonymized transcripts and performed a directed content analysis guided by existing data and literature. All team members reviewed results to identify candidate themes, which we corroborated through member checking to inform conclusions.

Results: We interviewed 30 surgical residents, including junior (n=11), mid-level (n=10), and senior (n=9) residents from three surgical departments. From these interviews, we identified four main themes with multiple subthemes (Figure 1). Residents found certain aspects of the new technocultural norm combined with altered practice patterns and demands to de-emphasize critical thinking, with all interviewees agreeing on the importance of re-centering critical thinking. Though we found topics and themes to be similar across specialties, there were different perspectives based on level of training.

Conclusions: Our data highlight the importance of structured education and a purposeful culture around how to use texting for clinical care without sacrificing critical thinking. As noted during interviews, emphasizing critical thinking will be increasingly important in the face of new technologies that provide unfiltered information and decision support.

Figure 1. Themes and sub-themes from resident interviews



Title: Impact of Reducing Time with Colostomies on Experience of Social Stigma for Children with Anorectal Malformations in South-Western Uganda

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Introduction:

Global disparities exist in the extent of social stigma experienced by children requiring colostomies for anorectal malformation (ARM) and their families. Improved access to pediatric surgery has resulted in more 1-stage ARM procedures in South-Western Uganda. We hypothesized that this change would decrease the social stigma experienced by families.

Methods:

A cohort study of families of ARM children compared the stigma experienced by those with colostomies to those without. The Kilifi Stigma Scale of Epilepsy (KSSE) was used to assess social stigma. Multivariable analysis assessed differences in the rate of stigma experienced, controlling for age at diagnosis, rurality, distance traveled, sex, and parental education. Secondary analysis assessed the impact of colostomy duration on stigma, with stratification according to parental education.

Results:

238 ARM patient/family dyads were included; 177 (74%) received a colostomy. Most patients were male(51%), lived in rural areas(71%), and had parents who attended no more than primary school(65%). For those without a colostomy, the median KSSE was 0(Q1-Q3 0-0), compared to 11(Q1-Q3 3-20) for colostomy. On multivariable analysis, those with a colostomy had 7.2 times the rate of social stigma of those without. The rate of stigma increased by 8% for each additional year that the colostomy was present (Table).

Conclusions:

Adopting a 1-stage ARM repair, which avoids colostomy creation, significantly reduces the experience of stigma, improving parental ability to return to work, children's school attendance, and ability to live without fear/abuse. Local pediatric surgical capacity-building is critical to improve access to these procedures, reducing ARM-associated morbidity.

Table

Multivariable Negative Binomial Regression Model Results for KSSE Score

Model	Incidence Rate Ratio	95% Confidence Interval	p-value
Colostomy versus No Colostomy	7.20	4.22 - 12.27	p<0.001
Duration of Colostomy (years)	1.08	1.03 - 1.14	0.003
Duration of Colostomy (years) if education = none/primary (n=159)	1.09	1.04 - 1.15	0.001
Duration of Colostomy (years) if education = secondary/tertiary (n=77)	1.06	0.99 - 1.13	0.11

TITLE: Development of a Medical Student Robotic Surgery Bedside Assist Curriculum

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BACKGROUND: The absence of a defined role for medical students during robotic surgery results in an unmotivating learning environment.¹ One potential role for students is as bedside assists. However, no curriculum exists to provide this training. We aim to conduct a needs assessment to aid in our development of a bedside assist curriculum to optimize medical student’s learning experience.

METHODS: We conducted an observational study to determine what is needed in a curriculum. Medical students participated in a 3-hour resident-led training with instruction and hands-on participation. Residents served as participant observers and took field notes focusing on challenging learning areas around port placement, docking, and instrument exchange. Sessions concluded with structured focus groups to gain insight into students’ experiences. Two authors (CG, ADM) conducted general thematic analysis of the field notes and focus group transcripts.

RESULTS/PRODUCT: Twelve medical students from years 1-3 participated in 4 sessions. Reoccurring challenges were observed with port insertion, docking, force and speed during instrument exchange, and lack of internal visualization to ensure safe instrument exchange. Students correctly performed all tasks by the end of the session. In our focus groups, 2 major themes emerged: first, a low-stakes, simulation-based learning environment with hands-on experiences and the opportunity for repetitions; second, clearly defined roles and expectations.

DISCUSSION: With training, medical students adeptly perform tasks needed to become proficient robotic bedside assistants. The findings from this needs assessment will inform the development of our inaugural curriculum, prioritizing a supportive learning atmosphere while ensuring goals and objectives distinctly outline student roles and expectations.

REFERENCES:

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Combating the Learning Curve for DIEP Flaps: Preliminary Results from a Cognitive Task Analysis Study

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Introduction: Despite low complication rates, deep inferior epigastric perforator flaps (DIEP) have steep learning curves.^{1,2} While operating time and re-exploration rates significantly decrease with experience, differences in cognitive and technical processes between a novice and expert are not fully understood.¹⁻³ We aim to: (1) define the tasks, decisions, and potential errors in a DIEP flap procedure and (2) analyze the expert cognitive behaviors involved.

Methods: Cognitive task analysis was performed using a semi-structured interview of a subject matter expert to explore the thoughts and behaviors that exemplify optimal performance of this procedure. The interview was supplemented with additional resources and coded based on a modification of the framework by Grover.^{4,5}

Results: We created a preliminary master task list including 227 subtasks, 61 potential errors, 71 technical tips, and 26 decisions, categorized into seven major tasks: pre-op workup, procedural preparation, flap dissection, chest preparation, revascularization, flap inset, and abdominal closure (Figure 1). Of the 10 cognitive behaviors identified, atraumatic tissue handling was the most prevalent. Revascularization was the major task with the highest number of subtasks, while potential errors were highest during chest preparation.

Conclusions: Our preliminary task list highlights critical areas for decision-making and error avoidance, as well as numerous technical tips that allow experts to perform DIEP flaps with optimal results. Ongoing work includes creating a visual framework for education and assessment.

Keywords: DIEP flap; microsurgery; breast reconstruction; perforator flap; surgical education; cognitive task analysis

Figure 1: The Seven Major Tasks of a DIEP Flap

	Preop Workup	Procedural Preparation	Flap Dissection	Chest Preparation	Re-vascularization	Flap Inset	Abdominal Closure
Subtasks	8	32	37	36	70	18	26
Potential Errors	2	4	16	18	16	3	2
Technical Tips	3	6	20	14	22	3	3
Aesthetic Considerations	2	17	5	1	0	10	5
Decisions	3	3	5	5	4	2	4

Title: Results from an Intraoperative Entrustable Professional Activity (EPA) Assessment Tool Pilot: What Aren't We Measuring?

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Background: In anticipation of the American Board of Surgery (ABS) rollout of EPAs, our program piloted the EPA assessment tool in 2022. Analysis aims to evaluate the assessment tool by exploring associations between entrustment, surgical skill and knowledge, and resident and faculty characteristics.

Methods: The assessment includes an overall entrustment score and four sub-scores: anatomy, steps of operation, recognition of potential errors, and surgical technique. Assessments captured name, PGY level, rotation, procedure, and case difficulty (straightforward, moderate, or complex). Faculty years in practice (range: 0-37 years), resident gender, and resident underrepresented in medicine (URiM) status were collected. Given strong intercorrelations ($r=0.45-0.69$) and high reliability ($\alpha=0.84$), the four sub-scores were summed to a composite score. Multivariable linear regression assessed for associations between overall score and composite sub-score, PGY level, case difficulty, faculty years in practice, resident gender, and resident URiM status.

Results: Between June 2022-2023, 46 faculty from 10 elective and emergent services completed 398 assessments for 44 residents (PGY1-PGY5). The linear regression model explained 55% of the variance. Overall entrustment score was most strongly associated with the composite sub-score, followed by case difficulty and PGY level. Faculty years in practice, and resident gender/URiM status were not significantly associated with entrustment (Table 1).

Conclusion: Our results suggest that faculty strongly consider resident intraoperative knowledge and technical skills when imparting autonomy. The gap in explained variance calls for exploration of other contributors to entrustment, such as non-technical skills, interpersonal variables, or other unmeasured sources of bias.

Table 1. Predictors of overall entrustment score. Composite score is a sum of the anatomy, steps of operation, recognition of potential errors, and surgical technique sub-scores.

Adjusted R²: 0.55

Factor	Coefficient	95% Confidence Interval	P-value
Composite sub-score	0.2209266	0.1952393, 0.246614	<i>0.000</i>
PGY level	0.0582903	0.0065626, 0.110018	<i>0.027</i>
Case difficulty	-0.0800315	-0.1486337, -0.0114294	<i>0.022</i>
Resident gender	0.0511072	-0.0575278, 0.1597422	0.356
URiM status	-0.0910269	-0.2108281, 0.0287743	0.136
Faculty years in practice	0.0038583	-0.6869178, -0.0024116	0.348

Title: Impact of the FDA Pediatric Device Consortia Program: A 15-Year Single Program Experience

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Introduction: To enhance the creation and accessibility of biomedical devices for children, the FDA initiated the Pediatric Device Consortia (PDC) Grant Program in 2009. This program funds five PDCs to boost pediatric device development. Here, we describe the framework and impact of the UCSF-Stanford PDC.

Methods: Our PDC, a collaboration between pediatric surgery and engineering departments, supports innovators from concept to market. It includes a weekly Innovator's Forum offering guidance and networking with a diverse professional community. Additionally, we organize an annual competition granting up to \$100,000 for new pediatric devices. With continuous support from local academic and innovation centers, we also employ Real World Evidence (RWE) to document device usage in children and work with manufacturers to approve devices for pediatric use.

Results: Our PDC is the only continuously funded group since the program's inception in 2009, including a renewal in 2023. Over 500 projects have been advanced via the Innovator's Forum. We have awarded \$1.4 million in funding through the Pitch Accelerator Competition and facilitated \$130 million in add-on funding. Twelve PDC-affiliated companies have gone from concept to First-in-Human studies, and twelve products are available in the market. One device received pediatric-specific use labeling from an RWE study. An estimated 20,000 children have been positively impacted by technologies developed through our PDC.

Conclusion: Despite the challenges in pediatric device development due to limited patient numbers and market size, our PDC demonstrates a successful model, facilitating innovative pediatric medical devices with FDA support and comprehensive medical technology expertise.

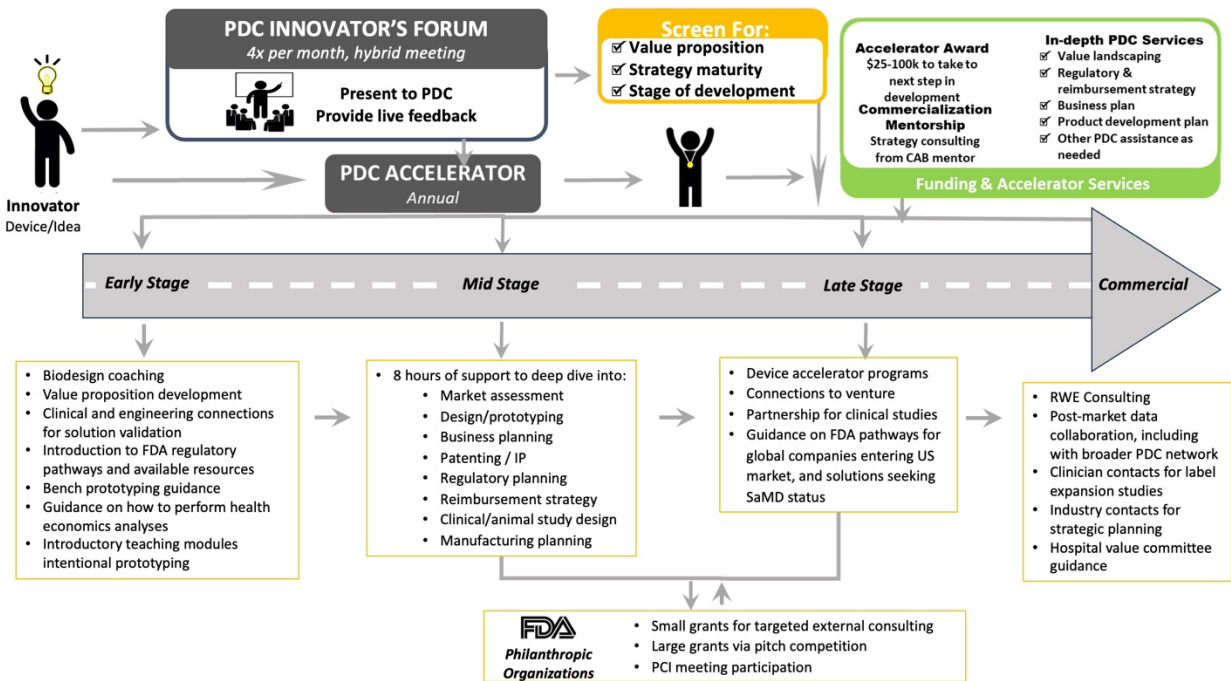


Figure 1: Overview of our Pediatric Device Consortium’s intake process, direct services, and longitudinal adjunct services to assist in development of pediatric medical technologies from ideation to commercialization.

MediStim Transit-time Flow Measurements of Coronary Artery Bypass Conduits in a Veteran Population

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Introduction:

Transit-time flow measurement (TTFM) is increasingly recognized as an important method to routinely assess coronary artery bypass graft (CABG) patency intraoperatively. However, variations in mean graft flow and pulsatility index (PI) according to different conduits, target coronary vessels, and bypass graft configurations are ill-defined.

Methods:

From 2019-2023, 137 CABG patients underwent intraoperative TTFM graft evaluation after protamine administration. Patient demographics, graft characteristics, and TTFM mean flow and PI were collected. TTFM results were compared among conduit types and target vessels using nonparametric independent t-tests.

Results:

Median flow rates through internal mammary arteries (IMA) were significantly lower than non-IMA, 36.0mL/min (IQR, 23.0-52.0) vs 44.0mL/min (IQR, 28.0-67.0), $p=0.003$, respectively. Left internal mammary artery (LIMA) and right internal mammary artery (RIMA) flow rates were similar, 35.0mL/min (IQR, 23.0-52.0) vs 38.0mL/min (IQR, 24.0-52.0), $p=0.13$, respectively, as were radial artery (RA) and saphenous vein grafts (SVG), 43.0mL/min (IQR, 27.0-67.0) vs 40.0mL/min (IQR, 28.0-65.0), $p=0.83$, respectively. Median flows to the left anterior descending coronary artery (LAD) were significantly lower when LIMA was used than RIMA, 35.6mL/min (IQR, 23-53) vs 53mL/min (IQR, 46.5-69), $p=0.03$, respectively. Additionally, Y-graft median flows were significantly greater than conduit extension grafts, 64.0mL/min (IQR, 20-42) vs 25.0mL/min (IQR, 60.8-74.8), $p<0.001$, respectively.

Conclusions: TTFM mean graft flows and PI varied significantly among conduit types and target vessels. As expected, IMA had significantly lower flows compared to non-IMA conduits, but surprisingly, RIMA to LAD grafts had significantly higher mean flows than LIMA. Future studies should evaluate TTFM correlation with long-term graft patency and clinical outcomes.

Table 1. Patient Characteristics

Patient Characteristics	Total (n=137)
Age	71 [64-74]
Female	1 (0.1)
BMI	27.7 [24.5-31.8]
Race	
Asian	11 (8)
Black or African American	9 (6.6)
Native Hawaiian/Pacific Islander	6 (4.4)
White or Caucasian	93 (67.9)
More than one race	1 (0.1)

<i>Unknown</i>	18 (13.1)
Hypertension	125 (91.2)
Diabetes mellitus	65 (47.4)
COPD	26 (19.0)
Peripheral Vascular Disease	13 (9.5)
Previous MI	31 (22.6)
Smoker	102 (74.5)
Cerebrovascular Disease	14 (10.2)
Cancer within last 5 years	15 (10.9)
Immunocompromised	4 (2.9)
Family History of Premature CAD	11 (8.0)
Dialysis	3 (2.1)
Sleep Apnea	38 (27.7)
Liver Disease	8 (5.8)
Syncope	7 (5.1)
Alcohol Use	65 (47.4)
<i><=1 drink/week</i>	32 (23.3)
<i>2-7 drinks/week</i>	16 (11.7)
<i>>=8 drinks/week</i>	17 (12.4)
Heart Failure	23 (16.8)
<i>Acute</i>	9 (6.6)
<i>Chronic</i>	14 (10.2)
Atrial Fibrillation	14 (10.2)
<i>Remote (> 30 days preop)</i>	11(8.0)
<i>Recent (=< 30 days preop)</i>	3 (2.1)
LVEF	
< 25%	3 (2.1)
25-34%	3 (2.1)
35-39%	4 (2.9)
40-44%	4 (2.9)
45-54%	16 (11.7)
>54%	100 (73.0)

Unknown	7 (5.1)
Previous Cardiac Intervention	18 (13.1)
Aortic Stenosis	13 (9.5)
Mitral Stenosis	0 (0)
Aortic Insufficiency	42 (30.7)
<i>Trivial/Trace</i>	25 (18.2)
<i>Mild</i>	13 (9.5)
<i>Moderate</i>	4 (2.9)
<i>Severe</i>	0 (0)
Mitral Insufficiency	80 (58.4)
<i>Trivial/Trace</i>	59 (43.1)
<i>Mild</i>	18 (13.1)
<i>Moderate</i>	1 (0.7)
<i>Severe</i>	2 (1.5)
Tricuspid Regurgitation	79 (57.7)
<i>Trivial/Trace</i>	63 (46.0)
<i>Mild</i>	13 (9.5)
<i>Moderate</i>	3 (2.1)
<i>Severe</i>	0 (0)
At Time of Admission	
<i>No Coronary Symptoms</i>	37 (27.0)
<i>Stable Angina</i>	37 (27.0)
<i>ST Elevation MI (STEMI)</i>	2 (1.5)
<i>Angina Equivalent</i>	13 (9.5)
<i>Unstable Angina</i>	30 (21.9)
<i>Non-ST Elevation MI (NSTEMI)</i>	16 (11.7)
<i>Other</i>	2 (1.5)
Number of Diseased Vessels	
1	16 (11.7)
2	40 (29.2)
3	74 (54.0)
4	7 (5.1)

Procedure Status	
<i>Elective</i>	123 (89.8)
<i>Urgent</i>	12 (8.6)
<i>Emergent</i>	2 (1.5)
NYHA Classification	
<i>Class I</i>	8 (5.8)
<i>Class II</i>	110 (80.3)
<i>Class III</i>	15 (10.9)
<i>Class IV</i>	4 (2.9)

Characteristics of 137 coronary artery bypass graft patients who underwent Medistim transit-time flow measurement at our institution between January 2019 and December 2023. Values are reported as median [interquartile range] or n (%). BMI, body mass index; COPD, chronic obstructive pulmonary disease; MI, myocardial infarction; CVD, cerebrovascular disease; CAD, coronary artery disease; LVEF, left ventricular ejection fraction; NYHA, New York Heart Association.

