Anesthesiology Research Collaborative (ARC) Research Newsletter

Welcome to the TPMG

Anesthesiology Research Newsletter!

The goal for the Anesthesia Research Collaborative is to promote and facilitate anesthesia and perioperative medicine research within Kaiser Permanente and The Permanente Medical Group, collaborate and learn from each other and other specialty groups, and tap into the vast potential of our integrated healthcare system to improve care for our patients.

Here we will highlight current or recently completed research projects led by clinician researchers and ongoing studies led by investigators at the Division of Research (DOR) involving our clinician researchers.

A Deeper Look Inside This Update:

- Research Highlight
- Upcoming events & funding
- Specialty Announcements
- Active and recent research projects
- Recent peer reviewed publications

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Research Highlight:

Prediction model could inform emergency surgery risks for older patients

Edited Version

By: Jan Greene

Kaiser Permanente researchers develop tool that could automatically pull relevant factors already available from a patient's health record

For patients over 65 who may need emergency surgery, clinicians often need to make difficult judgment calls, since older patients tend to have more surgical complications. A new predictive model developed by Kaiser Permanente researchers could help clinicians assess risk more objectively and quickly.

The Assessment of Geriatric Emergency Surgery (AGES) model was described in a study published in BMC Anesthesiology. AGES was developed using machine learning, a type of artificial intelligence that takes advantage of massive computing power to process large amounts of patient data to create a model that works well — it has strong predictive value.

The model calculates a risk score based on up to 76 predictors on a particular patient. A doctor can take that risk score into account along with all the medical, social, and other factors used to decide whether to recommend emergency surgery for an older patient.

The model performed well in testing, producing a predictive value of about 0.8. A value of 0.5 is like flipping a coin, Yap said; anything over 0.7 is good and over 0.8 is great. AGES tested similarly across races and ethnicities, and across male and female patients.

Among the 76 factors that can be automatically pulled from the patient record and included in the calculation were age, sex, body mass index, certain medical diagnoses, delirium score, lab results, and vital signs.

AGES was designed to predict an array of potential post-surgical conditions in the following 30 days, including heart attack, stroke, pulmonary embolism, renal failure, sepsis, and death.

The model was developed using data from 66,262 patients age 65 or older (average age 78) who had urgent or emergency non-cardiac surgery at one of 21 KPNC hospitals between 2017 and 2020. Data from 80% of the patients was used to design the model, and it was tested against data from the other 20%.

AGES could be used efficiently by doctors if it was embedded in the medical record and functioned automatically or with a simple request, the authors said. Currently, doctors may use other external calculators on a separate website, which takes time to type in patient information to get a risk score. Also, other surgical risk scores may not be developed specifically for older patients, or be able to predict multiple outcomes beyond mortality or cardiac arrest.

The predictive model's development is tied to a KPNC initiative called the Senior Surgical Care program, which focuses on 4 key areas of geriatric surgical care: goals and decision-making, avoiding delirium, preventing functional deterioration, and nutrition and hydration. The program, in place at 4 KPNC hospitals, has received a high-level geriatric surgery designation from the American College of Surgeons.

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Upcoming Events

ASRA:50th Annual Regional Anesthesiology and Acute Pain Medicine Meeting

Dates: May 1st – May 3rd, 2025
Location: Orlando, FL
For more information:
https://www.asra.com/events-education/event-item/2025/05/01/events/50th-annual-regional-anesthesiology-and-acute-pain-medicine-meeting

ANESTHESIOLOGY 2025 | October 10 - 14, 2025 | San Antonio, TX | Henry B. Gonzalez Convention Center

Dates: October 10th – 14th, 2025
Location: San Antonio, TX
For more information:
https://www.asahq.org/annualmeeting

2025 SOAP Annual meeting Leveraging Technology for Better Outcomes Improving Lives of Patients & Clinicians

Dates: April 30th – May 4th, 2025
Location: Portland, OROR
For more information: https://www.soap.org/

Internal Funding & Research Resources

- **General Funding Opportunities**
- **Delivery Science and Applied Research**
- **Specialty Research Networks**
- **Getting Started with Research**
- **Division of Research**

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Announcements

From Doug Corley, MD, PhD – Chief Research Officer TPMG

We are very pleased to announce the clinician-investigators selected for the fourth TPMG [Physician Researcher Program](#) cohort. This effort, thanks to TPMG's support of its Delivery Science and Applied Research program ([DARE](#)), provides sustained support for a community of physician clinician researchers who inform evidence-based improvements in clinical care and help support the development of clinician-investigator communities/networks in their specialties. They are replacing existing highly successful clinician-innovators who are graduating from the program.

The current thirteen physician researchers in the [TPMG Physician Researcher Program](#) are providing evidence for care changes across multiple topics, including pulmonary embolism, ovarian cysts, colorectal cancer surveillance, aortic stenosis, carotid vascular disease, breast cancer surveillance, risk-based population care, novel behavioral health strategies, stroke, prostate cancer screening, management of complex infectious diseases, congestive heart failure, and mental health treatment strategies. Through engagement with national specialty societies and Kaiser Permanente consensus panels, they have:

- **Changed national guidelines** that inform best-practice, evidence-based management of strokes, adnexal masses, colon polyp surveillance, pulmonary embolism, and many other conditions.

- **Authored approximately more than 400 publications** since starting with the program in 2017 (cohort 1), 2019 (cohort 2), and 2020 (cohort 3).

- **Created/supported new regional specialty research groups**, to support [new clinician-investigators](#) with community and to answer actionable clinical questions.

For the new cohort, almost 50 excellent clinician-investigators applied and six were ultimately selected by our regional executives and clinical specialty leads / able to be supported. Starting in August 2025, they will work together developing systematic evaluations of clinical care, facilitating the dissemination, and helping their specialties implement the resulting knowledge. They will collaborate with their specialty chief's groups and Associate Executive Directors, Division of Research scientists, Delivery Science and Applied Research program team members, and the existing physicians in the Physician Researcher Program.

 Congratulations and please welcome:

- **Jason Balkman (Radiology/Emergency, San Leandro) -** Improving accuracy & communication, reducing critical errors, and decreasing effort in radiology reports using large language models

- **Lisa Gilliam (Endocrinology, So San Francisco) -** Development and evaluation of continuous glucose monitoring (CGM)-based decision support for Type 2 DM

- **Fernando Velayos (Gastroenterology, San Francisco) -** Appropriate biosimilar medication use strategies in inflammatory bowel disease and extrapolations to similar pharmacy-supported programs

- **Edward Yap (Anesthesiology, So San Francisco) -** Anesthesia management strategies and outcomes in the senior surgical program

- **Jonathan Liang (Head and Neck Surgery, Oakland) -** Evaluating and testing chronic rhinosinusitis management strategies Including biologics

- **Dustin Ballard (Emergency, San Rafael) -** Incorporating emergency medical services (EMS) data into emergency department (ED) risk stratification

The Delivery Science Grants Program

The Delivery Science Grants Program is now accepting Spring 2025 applications. Letters of Intents are accepted now through May 9th, 2025.

For more information on how to submit a LOI, please review the instruction on the DARE website: [Funding Support - DARE - Delivery Science and Applied Research](#)

Active (ongoing) Research Projects and Collaborations

Safety of SGLT2 antagonist use in the periop / periprocedural period for non-emergent interventions.
Bradley Cohn, Julie Schmittdiel | Rapid Analytics Unit

Recent Peer Reviewed Anesthesiology Authored Publications; 2023 – 2024.

*KPNC authors listed in alphabetical order below. For details on author order, click on the link included to the PubMed Abstract.

Continuous wound infusion catheter as part of a multimodal analgesia regimen for post-Caesarean delivery pain: a quality improvement impact study
Authors: Hoang, Dan | Bja Open | March 1, 2024 | PubMed abstract

A patient activation intervention in primary care for patients with chronic pain on long term opioid therapy: results from a randomized control trial
Authors: Ghadiali, Murtuza Z; Marino, Catherine; Adams, Sara R; Campbell, Cynthia I; Charvat-Aguilar, Nancy; Does, Monique; Kline-Simon, Andrea H; Rubinstein, Andrea L; Weisner, Constance; Young-Wolff, Kelly C | Bmc Health Services Research | January 22, 2024 | PubMed abstract

Association of initial opioid prescription duration and an opioid refill by pain diagnosis: Evidence from outpatient settings in ten US health systems [PubMed Abstract] Altschuler, Andrea; Campbell, Cynthia I; Metz, Verena E; Palzes, Vanessa A; Rubinstein, Andrea L | 12/16/2023 | Preventive Medicine

Durable responses at 24 months with high-frequency spinal cord stimulation for nonsurgical refractory back pain [PubMed Abstract] Bruce, Diana; Cherry, Taissa N | 11/17/2023 | Journal Of Neurosurgery. Spine

Prescription Opioid Dose Reductions and Potential Adverse Events: a Multi-site Observational Cohort Study in Diverse US Health Systems [PubMed Abstract] Altschuler, Andrea; Campbell, Cynthia I; Metz, Verena E; Palzes, Vanessa A; Ray, Tom; Rubinstein, Andrea L | 11/6/2023 | Journal Of General Internal Medicine

Radiofrequency Ablation's Effectiveness for Treating Abdominal and Thoracic Chronic Pain Syndromes: A Systematic Review of the Current Literature [PubMed Abstract] Esenther, Brandon R | 11/1/2023 | Pain Physician

Training Anesthesiology Residents to Care for the Traumatically Injured in the United States [PubMed Abstract] Teng, Justin J | 5/1/2023 | Anesthesia And Analgesia

Continuous Ketamine Infusion as a Treatment for Refractory Facial Pain [PubMed Abstract] Tran, Johnathan V | 3/1/2023 | Cureus

Development and Validation of an Electronic Health Record-based Score for Triage to Perioperative Medicine [PubMed Abstract] Cohn, Bradley R; Corbin, Joel D; Kipnis, Patricia; Liu, Vincent; Myers, Laura C | 3/1/2023 | Annals Of Surgery

Reducing Volatile Anesthetic Waste Using a Commercial Electronic Health Record Clinical Decision Support Tool to Lower Fresh Gas Flows [PubMed Abstract] Olmos, Andrea V | 2/1/2023 | Anesthesia And Analgesia

Risk of cardiac events after elective versus urgent or emergent noncardiac surgery: Implications for quality measurement and improvement [PubMed Abstract] Dusendang, Jennifer R; Keny, Hemant V; Ng, Kevin P; Thoma, Mark S; Webb, Christopher A; Weyker, Paul D; Yap, Edward N; Herrinton, Lisa; Solomon, Matthew D | 2/1/2023 | Journal Of Clinical Anesthesia

Trends in Outpatient Visits and Hospital and Intensive Care Unit Admissions of Adults With COVID-19 in an Integrated US Health Care System, March 2020 to January 2022 [PubMed Abstract] Ng, Kevin P; Daly, Kathleen; Kipnis, Patricia; Liu, Vincent; Myers, Laura C; Plimier, Colleen | 1/3/2023 | JAMA Network Open