05. 09. 2026

2026
Resident Research Day Abstract Booklet

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Provincial Department of Anesthesiology

"Research is to see what everybody else has seen, and to think what nobody else has thought."

- Albert Szent-Györgyi

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CANADIAN ANESTHESIOLOGISTS' SOCIETY

Dr. Jon Gamble

Dear Colleagues and Friends,

It gives me great pleasure to once again welcome you to the Provincial Department of Anesthesiology's Annual Resident Research Competition. Despite the Residents' busy schedules and numerous demands of their time, our Department has a long tradition of excellence in Post Graduate Medical Education research. This year is no exception.

In addition to the excellent resident presenters and engaged anesthesiology faculty, we are honored to have judges from a variety of backgrounds promising to bring rich and rewarding discussions.

We are excited to offer a catered in-person option this year. We look forward to celebrating the successes of our residents and learn as we do so.

I look forward to spending a morning with each of you.

Jon Gamble

MD, FRCPC (Anes,CritCare)

Executive Directorof Research

Provincial Department of Anesthesiology

University of Saskatchewan

May 9th, 2026

7:00 - 8:00
BREAKFAST

08:00 – 08:15
OPENING REMARKS

8:15 – 9:15
ORAL PRESENTATIONS-
In Progress Projects

9:20 – 9:50
ORAL PRESENTATIONS-
Completed Projects

9:50 – 10:20
COFFEE BREAK &
R1 Posters

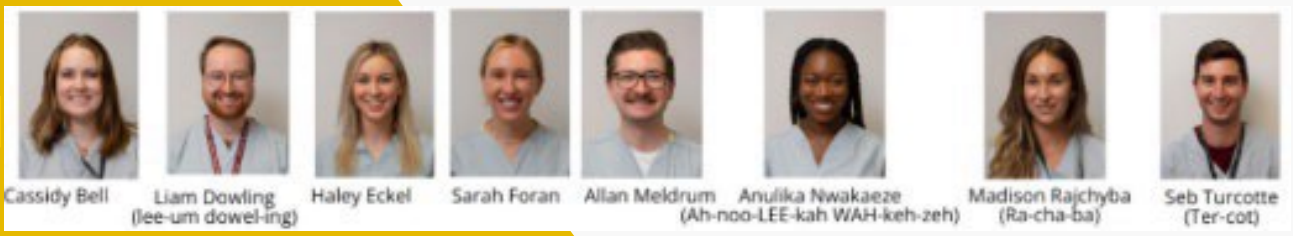
10:20 – 11:20
ORAL PRESENTATIONS-
Completed Projects

11:20 – 11:40
ADJUDICATION & AWARDS

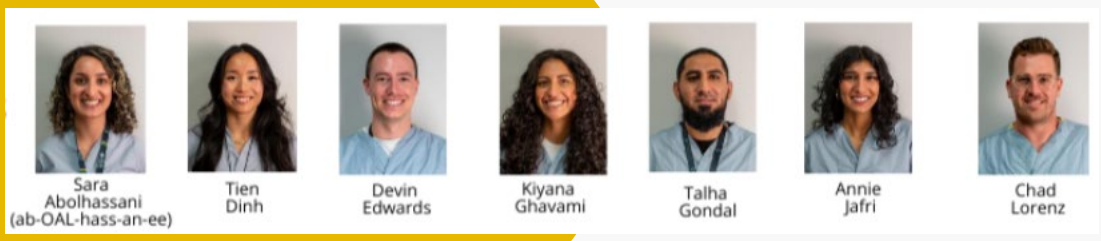
11:40
LUNCH
RRD AWARD PRESENTATIONS &
CLOSING REMARKS

Residents

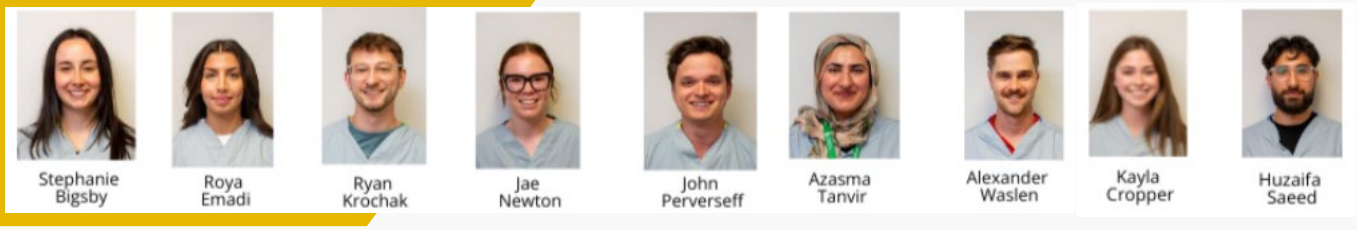
R4



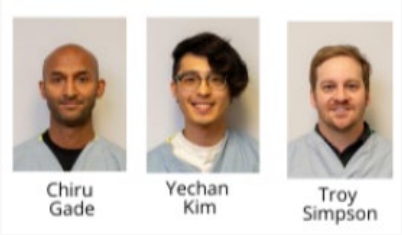
R3



R1



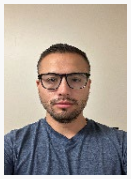
FPAs



Summer Student & Medical Student Abstracts

Grace Braaten

Muhammad Awan



Nicolas Romero

Wasim Al-Khanati

Thank you to our judges

Dr. Linda Chelico
Vice-Dean Research, Biomedical Sciences,
University of Saskatchewan

Dr. Linda Chelico is a Professor in the Department of Biochemistry, Microbiology and Immunology at the University of Saskatchewan, where she served as Department Head (2024-2026) and Director of the Protein Characterization and Crystallization Facility (2016-2026). She became the Vice Dean Research, Biomedical in the College of medicine on March 1, 2026. Dr. Chelico earned her Ph.D. in Applied Microbiology from the University of Saskatchewan in 2004, followed by postdoctoral training at the University of Southern California in biochemistry. She joined the University of Saskatchewan faculty in 2009 and was promoted to Professor in 2019.

Dr. Chelico is internationally recognized for her expertise on the APOBEC family of cytosine deaminases, beginning with the first biochemical characterization of APOBEC3G—work published in Nature Structural & Molecular Biology. Her research has since provided foundational insights into how APOBEC3 enzymes restrict HIV-1 replication, shape viral evolution, and contribute to somatic mutagenesis in cancer. She has authored numerous high impact publications across Nature Communications, Nucleic Acids Research, Cancer Research, and Journal of Virology, among others and is a TEDxUniversity of Saskatchewan speaker.

Her leadership in the field includes service on CIHR review panels, editorial board member for multiple scientific journals, and leadership roles in national and international conferences, including the Canadian Conference on HIV/AIDS Research and Gordon Research Conferences.

Dr. Chelico has been recognized with multiple awards for research excellence, mentorship, and supervision. Her program has been continuously funded by CIHR, NSERC, CFI, and other agencies, supporting innovative work on APOBEC enzymes in viral restriction and cancer biology.

Dr. Brian Brownbridge

Anesthesiology, College of Medicine, University of Saskatchewan

Born and raised in Saskatchewan, Dr. Brownbridge credits a deeply supportive family as the foundation of a career that has spanned decades of clinical excellence, leadership, and service. He completed three years of undergraduate studies in Physiology and Biology at the University of Saskatchewan before earning a Doctor of Medicine degree from the University of Saskatchewan College of Medicine (1982–1987). Following medical school, Dr. Brownbridge completed an internship at St. Paul's Hospital in Saskatoon (1987–1988).

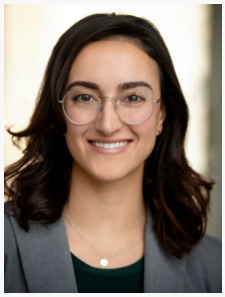
Dr. Brownbridge began his medical career as a general practitioner in Kindersley, Saskatchewan, before pursuing specialty training in anesthesiology. He completed an Anesthesiology Residency at the University of Saskatchewan from 1991 to 1995 and subsequently practiced as one of only two fellowship-trained anesthesiologists in Prince Albert. In 1998, Dr. Brownbridge was appointed Clinical Head of Anesthesiology in Saskatoon, a role he held until 2001.

From 2001 to 2004, Dr. Brownbridge served internationally as Department Head of Anesthesiology at Shaikh Khalifa Medical Center in Abu Dhabi, providing leadership within a complex and rapidly evolving healthcare environment. Upon returning to Canada, he continued his practice in anesthesiology and critical care in Saskatoon, where he also held multiple senior executive and leadership positions.

Dr. Brownbridge has made significant contributions to medical education and professional governance. He was a founding member of the USask COM Simulation Program, working alongside Dr. Neil Cowie to advance experiential medical training. He also served as the Royal College of Physicians and Surgeons of Canada Anesthesiology Specialty Committee representative for Saskatchewan and Manitoba for four years. In addition, Dr. Brownbridge dedicated seven years to the Council of the College of Physicians and Surgeons of Saskatchewan, including three years as President, helping to guide provincial medical regulation and policy.

Dr. Alixe Pellerin

Anesthesiologist, College of Medicine, University of Saskatchewan



Dr. Alixe Pellerin was born and raised in Saskatoon, Saskatchewan. She completed a Bachelor of Science in Microbiology and Immunology at the University of Saskatchewan in 2011, followed by a Bachelor of Science in Nursing in 2015. Dr. Pellerin earned her Doctor of Medicine degree from the University of Saskatchewan in 2020, and completed her residency in Anesthesiology in 2025. She now practices as a staff anesthesiologist in Saskatoon, providing care in both adult and obstetrical anesthesia.

She is the co-founder of **AirwayBreathingCoffee**, a free online medical education platform, and is currently completing the **Clinical Educator Diploma Program**, a fellowship in medical education. She is actively involved in the departmental Quality Assurance Committee and has a strong interest in initiatives aimed at improving patient care. Her academic interests include multidisciplinary teaching, point-of-care ultrasound (POCUS) and digital education.

Outside of her clinical and academic work, Dr. Pellerin enjoys drawing, singing and playing guitar, and spending time at home with her husband and chocolate lab, Zoe.

Abstracts

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38th Annual Resident Research Day

Abstracts

Enabling Competency 4.5: Summarize and communicate to professional and lay audiences, including patients and their families, the findings of relevant research and scholarly inquiry

ORAL PRESENTATIONS

In Progress Projects

From Screens to Simulation: A Hands-on Health Sciences Curriculum to Improve Healthcare Career Interest Among High School Students

Sara Abolhassani BSP MD, Justina Koshinsky MD FRCPC, Henry Bi MD FRCPC
Department of Anesthesiology, College of Medicine, University of Saskatchewan

Introduction: Canada continues to face substantial healthcare workforce shortages, increasing the need to expose students to healthcare careers earlier in their education. Simulation-based learning has been shown to improve engagement with health sciences content and may help students see healthcare careers as more accessible. Existing high school health sciences materials are often less hands-on and may not reflect local curricular objectives or Canadian healthcare practice. This project will develop and evaluate a hands-on, low-fidelity simulation curriculum for Saskatchewan Health Studies 20 and Biology 30 students. The objective is to determine whether selected low-fidelity simulation experiences increase students' interest in health sciences and motivation to consider healthcare careers.

Methods: We will conduct a mixed-methods pre-post intervention study in collaboration with high school teachers in the Saskatoon Public School Division. Approximately 75 students from Health Studies 20 and Biology 30 classes, taught by two participating teachers, will complete hands-on, low-fidelity simulation activities linked to existing curricular objectives and practical healthcare skills. Student surveys will be administered before and after the intervention to assess interest in health sciences, motivation to pursue healthcare careers, perceived relevance of course content, and confidence with selected health-related skills. Teacher feedback will be collected after the intervention to assess feasibility, implementation barriers, and opportunities for improvement. Quantitative survey responses will be analyzed using paired pre-post analyses appropriate to response type, and qualitative responses will be reviewed for recurring themes. Ethics approval has been obtained from the University of Saskatchewan and Saskatoon Public School Division. Data collection is expected to be completed by June 2026.

Expected results: We anticipate that students will report increased engagement with health sciences content after participating in the hands-on simulation activities. We also expect improvement in students' perceived relevance of the curriculum, confidence with selected healthcare skills, and interest in healthcare careers. Teacher feedback is expected to identify practical considerations for integrating simulation-based activities into existing high school courses.

Discussion: This study will evaluate whether a locally adapted, skills-based simulation curriculum can improve student engagement in high school health sciences education. If feasible and well received, the intervention may provide a model for expanding hands-on health sciences learning beyond Saskatoon, including to rural Saskatchewan high schools. The findings may inform future curriculum development aimed at strengthening early exposure to healthcare careers and supporting long-term health workforce recruitment.

Exploring Anesthesia Residents' Experiences with Microaggressions in The Clinical Learning Environment

Annie Jafri MD, Tien Dinh MD, Jessica Bruce MD, FRCPC
Department of Anesthesiology, University of Saskatchewan

Introduction: Microaggressions are defined as everyday insults, slights, invalidations arising from conscious or unconscious bias towards a person. Microaggressions can occur during interactions with well-intentioned people who may be unaware that their behaviour is harmful. It is well established that learners within medicine are particularly vulnerable to experiencing microaggressions[1–4]. Anesthesiology has unique professional and structural characteristics that may increase exposure to microaggressions[5], including an underappreciation of the anesthesiologist's role by patients and colleagues, high-pressure environments[6], and interdisciplinary dynamics, but this has not been well examined in Canada. Microaggressions are associated with increased frequency of medical errors, burnout[7], and reduced psychological safety. This study aims to explore anesthesiology residents' experiences of microaggressions their impact on wellbeing and training.

Methods: This is a cross sectional, mixed methods survey study. An electronic survey will be distributed to all anesthesiology residents (PGY-1 to PGY-5) across Canada using a census sampling approach. No a priori sample size calculation was performed. Quantitative data will be analyzed using descriptive statistics. Qualitative responses will undergo thematic analysis. Comparative analyses may be performed depending on response rates and data distribution.

Results: N/A

Discussion: This study addresses a gap by examining microaggressions in Canadian anesthesiology training. The mixed-methods approach will capture both the prevalence and impact microaggressions have on wellbeing and training. Limitations include response bias in a survey-based study with voluntary participation. Cross sectional design captures perspectives at a single point in time and may not reflect changes over the course of training, or in response to evolving educational or clinical environments. We hope this study provides a foundation for future work aimed at improving anesthesiology training in Canada. The findings may inform targeted educational interventions, program development, and/or policy considerations. Further research could include longitudinal studies or program-specific evaluations to better understand how resident experiences evolve over time and how identified gaps can be effectively addressed.

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A Survey of Acute Normovolemic Hemodilution Practices in Canada

AUTHORS: Devin Edwards, Michelle Clunie, Oksana Prokopchuk-Gauk

Rationale: Blood transfusions are life saving interventions that are used routinely in high bleeding risk surgeries (eg cardiovascular surgeries). Blood transfusions are known to have risks, ranging from mild to life threatening transfusion reactions. Blood transfusion is also associated with worse clinical outcomes both in the short and long term.[1-4] In Saskatoon we employ several transfusion sparing techniques to minimize the amount of transfusions given to patients during operations. These techniques have been shown to reduce blood transfusion need and include cell saver, back-priming of cardiopulmonary bypass pumps with patient blood, and tranexamic acid use. [5-7] One less frequently used transfusion sparing technique is autologous blood donation.[8-13] At present there is little information available on how frequently this intervention is used in Canadian cardiac surgeries, nor is there a good understanding of the techniques and protocols currently being used.

Research Questions:
- Are autologous transfusion techniques being used in cardiovascular surgeries in Canadian centers?
- What techniques (if any) are being used for autologous transfusions?
- Would there be benefit to creating an autologous blood transfusion protocol for use in Saskatchewan?

Data Analysis: A short (< 10-minute) survey will be sent to publicly available email addresses for the cardiovascular surgery and cardiovascular anesthesia centers in Canadian hospitals. An invitation email will ask the recipient to disseminate the email/survey invitation to the cardiovascular surgeons and cardiac-trained anesthesiologists at the site. Survey responses will be analyzed both quantitatively and qualitatively. Questions involving a Likert scale will be assessed for mean and median responses, while questions involving text boxes will be assessed for recurring themes. Survey takers will be given the option to share their autologous transfusion protocols. Any shared protocols will be assessed and compared to techniques described in contemporary literature.

Expected Outcomes: We expect to gain a better understanding of current autologous transfusion use in Canadian centers. We hope to use these results to guide future patient blood management protocolization in Saskatoon, informing whether or not autologous transfusion techniques should be considered for more frequent use. Any recommendations on protocolization will come from comparison between current practices and protocols used in contemporary literature.

Plans for Dissemination: A manuscript will be drafted following analysis of the survey data. The results of the survey and will be shared at the Department of Anesthesiology resident research day at the University of Saskatchewan, and the manuscript will be submitted to the Canadian Journal of Anesthesiology for consideration of publication. Study results will be made available to the survey participants.

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Intraoperative End-Tidal CO_2 and Post-Operative Delirium in Cardiac Surgery: A Retrospective Cohort Study

Chad Lorenz MD, Mary Ellen Walker RN PhD, Peter Hedlin PhD MD FRCPC
Department of Anesthesiology, University of Saskatchewan, Royal University Hospital, Saskatoon, SK

Introduction: Post-operative delirium (POD) has a reported incidence that varies widely—from 10 to 50% - depending on patient vulnerability factors such as age, cognitive reserve, and comorbidity, as well as anesthetic/surgical risk factors such as surgery duration and type. The role of other modifiable intraoperative risk factors - such as volatile anesthetic dosage, depth of anesthesia, and $etCO_2$ - remains poorly defined. Mutch et al. (2018) found that intraoperative hypocapnia was significantly associated with POD, whereas cumulative volatile anesthetic exposure was not; however, cardiac surgery patients were excluded. $etCO_2$ influences cerebral vasodilation. Hypocapnia may trigger hypoperfusion of vulnerable brain regions with impaired vasoreactivity, influencing the risk of POD. This study investigates whether intraoperative $etCO_2$ is associated with POD in adult cardiac surgery patients.

Methods: Anesthetic and clinical records were retrospectively reviewed for adults undergoing elective cardiac surgery at Royal University Hospital, Saskatoon between April 1st, 2022 and March 31st 2023. High-frequency intraoperative data was extracted from anesthetic records. The primary exposure was intraoperative $etCO_2$. Secondary exposures included EEG spectral edge frequency and mean arterial pressure. POD (binary) was identified through structured chart review. Binary logistic regression controlled for age, sex, CPB time, diabetes, lactate, hemoglobin, psychotropic medications, SEF, and mean arterial pressure.

Results: Preliminary analysis included 281 patients (57 [20.3%] with POD; 224 [79.7%] without). Patients with POD were older (median 69.0 vs. 65.0 years) and had longer CPB times (median 129.1 vs. 117.3 minutes). Age (OR 1.05, 95% CI 1.01–1.09, p=0.014) and CPB time (OR 1.01, 95% CI 1.00–1.02, p=0.005) were significant independent predictors of POD. Average intraoperative $etCO_2$ was not a significant predictor (OR 0.95, 95% CI 0.86–1.05, p=0.286).

Discussion: Older age and prolonged CPB time independently predicted POD, consistent with existing literature. The null finding for average $etCO_2$ may yet be consistent with Mutch et al.'s finding that $etCO_2$ deviations exceeding 5 mm Hg below a patient's intraoperative median will increase their risk of POD. These results are preliminary; future analysis will examine $etCO_2$ as area under the curve (AUC) in a similar fashion to Mutch et al. (2018).

Key Reference: Mutch WAC, El-Gabalawy R, Girling L, Kilborn K, Jacobsohn E. End-Tidal Hypocapnia Under Anesthesia Predicts Postoperative Delirium. Front Neurol. 2018;9:678.

ORAL PRESENTATIONS

Completed Projects

Better Blood Pressure Monitoring in Surgery: A Comparative Study of Arterial Line and ClearSight Monitor System

Eckel H[1], Goncin U[1], Walker ME[1], Hedlin P[1][Text Wrapping Break][1]Department of Anesthesiology, University of Saskatchewan, Saskatoon, Canada

Introduction: Intraoperative blood pressure monitoring is essential for detecting hemodynamic instability and preventing adverse outcomes.[1] Invasive arterial line monitoring is the gold standard,[2,3] but carries a number of procedural risks.[4] The Edwards Lifesciences ClearSight system provides continuous non-invasive monitoring using a finger cuff,[1] but its accuracy in patients with cerebrovascular disease has not been established. This study aimed to evaluate the agreement, interchangeability, and time to placement of ClearSight compared with arterial line monitoring in patients undergoing elective neurointerventional procedures.

Methods: In this prospective observational study, patients undergoing elective neurointerventional procedures had simultaneous monitoring with a radial arterial line and ClearSight system. Paired systolic, diastolic, and mean arterial pressure measurements were recorded every 12 seconds. Agreement was assessed using bias, Bland–Altman analysis, percent error (PE), agreement tolerability index (ATI), and interchangeability (≥95% within ±5 mmHg). Time to placement was compared using paired t-tests.

Results: Twelve patients were included (mean age 56.5 ± 10.7 years; 83% female). Over 6,000 paired measurements were analyzed for each parameter. Fixed bias was present for systolic (−8.66 mmHg, $p<0.001$) and diastolic (−4.76 mmHg, $p<0.001$) pressures, but not for mean arterial pressure. Proportional bias was statistically significant but small.
Limits of agreement exceeded ±5 mmHg for all parameters. Percent error was high (74–80%), exceeding thresholds for interchangeability. Only 20–38% of measurements were within ±5 mmHg. ATI indicated acceptable agreement for systolic and diastolic pressures and marginal agreement for mean arterial pressure (1.14).
ClearSight placement was faster than arterial line placement (1.87 ± 1.05 vs 4.92 ± 3.11 minutes; $p=0.004$).

Discussion: ClearSight monitoring was not interchangeable with arterial line measurements based on clinically accepted thresholds, primarily due to high percent error and low interchangeability rates. While some statistical measures suggested acceptable agreement, these findings were not consistent across all metrics. A key strength of this study is the large number of paired measurements obtained per patient. Limitations include small sample size, potential measurement artifact, and lack of assessment for temporal lag between monitoring modalities. Despite these limitations, the significantly shorter time to placement and non-invasive nature of ClearSight may support its use in select clinical scenarios where rapid monitoring is prioritized. Further studies are needed to evaluate its performance across broader patient populations.

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Assessing Caregiver Understanding of Fasting Guidelines for Pediatric Day Surgery

Anulika Nwakaeze, MD[1]; Krissie Urmson, MD[1]
[1] *Department of Anesthesiology, University of Saskatchewan, Saskatoon, SK*

Introduction: Preoperative fasting guidelines aim to reduce the risk of pulmonary aspiration of gastric contents during anesthesia, while minimizing unnecessarily prolonged fasting duration. Clinical experience suggests fasting instructions are frequently misunderstood, contributing to non-adherence and patient distress. There is a gap in the literature regarding communication of fasting guidelines in the pediatric population. This study's objective was to assess caregiver understanding of fasting instructions for pediatric day surgery to identify opportunities to improve fasting guideline adherence.

Methods: This observational survey study assessed caregiver understanding of preoperative fasting instructions at a single academic pediatric surgical centre. Caregivers of pediatric patients scheduled for elective day surgery were eligible for inclusion. Caregivers were recruited in the postoperative waiting room and asked to complete a survey assessing understanding of fasting guidelines, self-reported adherence, sources from which instructions were received, and caregiver-identified barriers to compliance. Descriptive statistics were used to analyze results.

Results: Seventy-two caregivers completed the survey. All respondents were aware that their child was required to fast prior to surgery and reported adhering to the instructions provided. Regarding the rationale for fasting, 61.1% (n=44) correctly identified prevention of pulmonary aspiration as the primary reason. For solid food, 88.9% (n=64) fasted their child for greater than 8 hours, exceeding the current recommended 6 hour guideline. For clear fluids, 54.2% (n=39) fasted their child for greater than the recommended 1-2 hour guideline. Anesthesiologists were the least frequently cited source of fasting instructions, providing instructions to only 5.6% (n=4) of caregivers. The most commonly identified barrier to following fasting instructions was an anxious or irritable child (48.6%, n=35).

Discussion: These findings suggest that while caregivers generally comply with fasting instructions, they tend to fast their children beyond recommended durations, which may contribute to perioperative anxiety and physiologic derangement. A strength of this study is the direct caregiver survey methodology. Limitations include single-centre recruitment and possible recall bias. The underrepresentation of anesthesiologists as a source of fasting information highlights a gap in provider-led communication. Future work will focus on developing standardized caregiver-directed educational tools to promote guideline-concordant fasting, improving patient experience and perioperative outcomes.

Can Video Priming Improve Informed Consent Regarding Resuscitation Goals Among Healthy Adults in Saskatchewan?

Madison Rajchyba, MD[1], BFA; Julie McKenna[2], Ramya Reddy[2], Paula Kirk[2], Darcie Earle[1], Jennifer O'Brien, PhD[1], Justina Koshinsky, MD, FRCPC[1]
[1] Department of Anesthesiology, University of Saskatchewan, College of Medicine
[2] Patient Partner, Saskatchewan Centre for Patient-Oriented Research

Background: Code status and resuscitation decisions are often made under stress and time pressure, and many people lack a realistic understanding of cardiopulmonary resuscitation (CPR), survival probabilities, and post-resuscitation outcomes. Written advance care planning materials alone may be insufficient to support informed consent, particularly among healthy adults who rarely engage in these discussions.

Objective: To evaluate whether a video-based decision aid improves understanding of resuscitation, corrects misconceptions about CPR outcomes, and supports code status decision-making among healthy adults compared with the use of written materials alone.

Methods: A mixed-methods, within-person study was conducted among healthy Saskatchewan adults aged 18 years and older. Participants completed the Saskatchewan Health Authority advance care planning workbook and then viewed a purpose-designed video depicting life-prolonging, basic medical, and comfort-focused care. Knowledge, perceived understanding, and acceptability were assessed after each intervention using validated and adapted measures. Paired analyses were used to evaluate within-person change. Open-ended responses underwent inductive thematic analysis to explore participant experiences and mechanisms of change.

Results: Fifty participants completed both interventions. Despite high baseline knowledge, scores increased after the video (mean change 0.28 points, 95% CI 0.14–0.42; $p < 0.001$, Cohen's $dz = 0.56$), with larger effects when CPR survival accuracy was included (Cohen's dz up to 0.85). Perceived understanding increased by 24.7 points on a 100-point scale, and accurate estimates of in-hospital CPR survival increased from 50% to 88%. Qualitative themes indicated that realistic visual depictions promoted emotional engagement, recalibrated expectations about survival and quality of life, and prompted reflection on personal values and family communication.

Conclusions: Adding a video-based tool to written advance care planning materials improved understanding, corrected unrealistic expectations, and may support more informed, values-based code status decisions among healthy adults. Realistic, emotionally engaging content appeared to support rather than hinder informed consent, suggesting a role for multimodal educational tools across the adult lifespan.

Analyzing the Implementation of a Local Multimodal Rib Fracture Pathway Using the Consolidated Framework for Implementation Research (CFIR)

Sebastian Turcotte, Alena Stirling, Kathy Campbell, Jennifer O'Brien, Vicky Loessin

Background: Rib fractures are highly prevalent in trauma patients, occurring in up to 9-10% of trauma patients presenting for care. Rib fracture pathways are evidence-based interventions created to offer high-level, multi-disciplinary care and have shown to reduce the length of ICU stays and reduce the rates of secondary complications. From a systemic standpoint, these pathways are effective in reducing health care costs by reducing length of hospital stay and in preventing re-admissions due to inadequate pain control or other complications. A Rib Fracture Working Group in Saskatoon implemented their own rib fracture pathway at Saskatoon's main tertiary trauma center. Through this pathway, patients were triaged based on pain scale, number of fractures, and vital capacity on presentation. This project has two main research questions: 1) What barriers and facilitators exist in the implementation of Saskatoon's local rib fracture pathway? 2) What is the view of the frontline health care staff in the acceptability and feasibility of the rib fracture pathway implemented at RUH?

Methods: This is a mixed-methods action study with a focus on implementation. The study occurred at Royal University Hospital. Study participants included key stakeholders in the implementation and execution of the rib fracture pathway, as well as front-line health care workers caring for patients. Data was collected through semi-structured interviews and well as acceptability/feasibility surveys attached to order sets being used by members of the multidisciplinary team caring for patients. Data collection and analysis was be performed using constructs derived from the Consolidated Framework for Implementation Research (CFIR). Thematic analysis was used to yield recommendations for the project moving forward.

Results: Eight semi-structured interviews and twenty-three surveys were collected. The CFIR framework was utilized to identify key themes that facilitated the implementation of this pathway. These included patient-centered structure, strong evidence supporting its use, proactive advocacy from various key stakeholders, and an organized plan for implementation. Barriers identified included systemic issues including bed flow constraints within the hospital, conflicting policies from various levels of the health care system, and a lack of human resources in the form of bedside health care workers and timely access to anesthesia services. Bedside surveys provided positive results and overall support that this pathway be continued for ongoing rib fracture management at RUH.

Discussion: Overall, the rib fracture pathway was implemented successfully at RUH. The pilot project was extended indefinitely as the working group navigates the barriers identified in this study to formalize a permanent order set within the SHA. This study will be used as an anchor for ongoing QI studies that will address the systemic barriers identified in the data collected.

Understanding and Engaging Healthcare Providers to Expand Bereavement Support in the ICU: A Survey Evaluation of the Co-Creative Workshop Experience

Talha Gondal, Anum Nooruddin, Nigel Hey, Cari McIlduff, Jennifer M. O'Brien, Sabira Valiani

Background: Intensive care unit (ICU) bereavement is a complex process, and most ICUs lack structured support for bereaved families. Co-creation is an emerging collaborative methodology that engages stakeholders to develop contextually appropriate solutions, yet few studies have evaluated healthcare providers' experiences with co-creative processes.

Objective: To evaluate ICU healthcare providers' experiences of participating in co-creative workshops aimed at developing bereavement support, including their perceptions of pre-workshop materials and anticipated changes to clinical practice.

Methods: A survey evaluation was conducted following eight co-creative workshops involving multidisciplinary ICU healthcare providers from two tertiary care centres in Saskatchewan, Canada. The questionnaire contained quantitative (closed-Likert scale) and qualitative (open-ended) items drawn from validated tools and developed de novo. The survey was pre-tested with ICU Nurse Managers and a Research Facilitator prior to distribution.

Results: Thirteen of 24 workshop participants (54.2%) completed the survey. The majority (84.6%) had no prior co-creation experience. Participants rated the pre-workshop materials highly, with all respondents agreeing or strongly agreeing that information about other ICU bereavement interventions was important to include. Twelve of 13 respondents (92.3%) reported improved confidence in providing care to bereaved families. Qualitative responses reinforced these findings, with participants describing the workshops as engaging and interactive, and identifying plans to enhance communication with families, support both families and staff, and incorporate advance care planning, the sharing of bereavement resources, and strategies to address complex grief into their clinical practice.

Conclusion: ICU healthcare providers experienced co-creative workshops positively and reported improved confidence and anticipated practice changes. Co-creation appears to be a feasible and engaging methodology for developing bereavement support in critical care settings.

The Misunderstood Anesthesiologist: A Prospective Cohort Study Comparing the Effectiveness of Educational Media in Preoperative Assessment Clinics

Authors: Dr. Allan Meldrum, Dr. Kiyana Ghavami, Jade Ong-Tone, Sibtain Ali, Dr. Mary-Ellen Walker, Dr. Henry Bi

Background: Over 50% of the Canadian population are unable to identify that the most responsible anesthesia provider during their surgical procedure was a physician. Majority of teaching around the perioperative process is conducted at the pre assessment clinics (PAC). Efforts have been made to provide patient education at this time, but knowledge retention is poor, especially about the role of the anesthesiologist. There is a gap in current literature about which education media is best for knowledge retention around the perioperative process. We hypothesize that educational media will increase knowledge retention, and that computer-based media such as videos or websites will have a stronger long-term impact on knowledge retention compared to written or didactic teaching.

Methods: Adult patients undergoing elective surgeries were selected from Saskatoon City Hospital PAC over a three-month period. There were four study cohorts including one control group receiving verbal education only, and three intervention groups receiving verbal education plus either written, audiovisual, or website-based education. Data involves a questionnaire testing knowledge of an anesthesiologist role collected at three different time points: pre-PAC visit, post-PAC visit, and post-surgery day one. Generalized linear mixed-effects regression analyses were conducted, with study arm and testing time included as primary predictors and age, gender, and education level entered as covariates.

Results: Of the 585 patients screened in PAC, 196 completed the pre-PAC survey, 70 post PAC, and only 33 the post-surgery survey. When comparing knowledge retention scores between educational materials, there was no significant difference observed ($p=0.439$) while controlling for age, gender, and education. However, there is a significant difference in total score percentage between assessments ($p<0.001$). Pre-assessment total scores (LSM=57.6) are significantly lower than post-PAC total scores (LSM=70.5, $p<0.001$) and post-op total scores (LSM=68.4, $p<0.001$). Anesthesia related anxiety significantly decreased from pre-assessment (LSM=3.8) to post-PAC (LSM=3.0, $p=0.008$) but there was no difference in anxiety levels between educational material ($p=0.624$).

Discussion: Computer based educational media did not have a stronger impact on knowledge retention compared to written or didactic teaching. There is increased knowledge retention for a patient regarding their surgery when any form of teaching is reviewed with them preoperatively. However, patient education in PAC was not associated with less perioperative anxiety. More research needs to be conducted with larger sample sizes to determine what form of educational material we should be providing to our patients, if any, and what the positive outcomes of doing so would be.

R1 Proposed Projects

Connect-ICU: Implementing human-centered communication solutions to improve patient and family-centered care while addressing provider wellness and workload in the ICU

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Background: Patient- and family-centred care (PFCC) is an approach to health-care delivery grounded in a collaborative partnership among patients, families, and healthcare providers (HCPs). This framework is relevant in the intensive care unit (ICU), where effective communication is essential for building trust, understanding patients' goals and values, and supporting families through challenging experiences. Studies have demonstrated that communication with ICU clinicians is among the most highly valued aspects of care for patients and their families, yet communication in this setting remains inconsistent. Research at the University of Saskatchewan has allowed for development of a journey map of the ICU experience to identify opportunities to enhance PFCC and potential threats to its delivery.

Research Question(s): How can co-created solutions be applied to develop a communication strategy in the ICU that improves PFCC without negative consequences on the wellbeing and workload of HCPs?

Methodology: A multidisciplinary team (the RUH Connect-ICU Team) will collaborate to develop communication solution prototypes to be implemented in the ICU at Royal University Hospital. Baseline data pertaining to unit acuity, patient complexity, quality of PFCC, and HCP moral distress and burnout will be collected prior to implementation. Immediately post-implementation, as well as at 6 and 12 months post-implementation, the above data collection will be repeated, in addition to collecting data regarding feasibility and sustainability. Descriptive statistics will be used to compare data at the various timepoints. Meeting minutes from the RUH Connect-ICU Team and feedback from bedside HCPs will be analyzed qualitatively to understand and contextualize the findings.

Expected Results: As a pilot study, there will be insufficient power to demonstrate statistically significant effects on PFCC and HCP wellness and workload. However, we expect the communication strategy will show a positive trend toward improving PFCC without compromising HCP well-being or workload. Solutions showing positive effects will be used to establish a communication toolkit.

Discussion: N/A

Expected Conclusions: It is expected that the study will demonstrate feasibility and sustainability of a low-resource, high impact communication in the ICU. Results will be important for guiding future studies to form the basis of communication strategies in ICUs across Canada.

Recommendations: N/A

Implementing and Evaluating a Multidisciplinary Delirium Prevention Pathway to Reduce Postoperative Delirium in Older Adults with Cognitive Decline: A Pilot Study

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Background: Postoperative delirium (POD) is a common complication in older surgical patients and is associated with longer hospital stays and increased mortality. POD impacts patients, their families, and the Saskatchewan healthcare system. Multimodal POD prevention pathways have been shown to reduce delirium incidence, duration, and healthcare costs. The growing number of older surgical patients necessitates implementation of a multimodal pathway to reduce and treat POD; however, no standardized pathway currently exists in Saskatchewan. This study aims to implement and evaluate a multidisciplinary POD prevention pathway with 100 older surgical patients.

Research Questions:
- Is a program to reduce POD risk feasible using the co-developed pathway?
- Does a co-developed pathway improve identification of patients at risk for POD?
- Are patients, caregivers, and healthcare providers satisfied with the multidisciplinary, patient-oriented pathway?

Methods/Methodology: This is a prospective study that will be piloted at Saskatoon City Hospital and Royal University Hospital. We aim to recruit 100 patients and 30 healthcare personnel. Eligible patients will be identified by Preoperative Admission Clinic staff, and meet three of the following criteria: 70 years or older, history of stroke/transient ischemic attack and/or pre-existing dementia/cognitive impairment, advanced chronic kidney disease and/or cirrhosis/liver dysfunction and/or diabetes, sensory deficits (hearing and/or vision), and history of falls. Consenting patients will have their medical charts reviewed for Geriatric Evaluation and Management (GEM) assessments, medication optimization, timely delirium assessments, and any Geriatric Psychiatry referrals. Patients will be invited to complete a questionnaire to assess satisfaction and other patient-oriented outcomes. All healthcare personnel who partake in the POD pathway will be invited to complete the healthcare personnel satisfaction questionnaire.

Expected Outcomes: We will evaluate adherence to the pathway and its impact on predefined clinical, health system, and patient-oriented outcomes, including delirium incidence, length of stay, and patient and provider satisfaction.

Discussion: N/A

Expected Conclusions: We hope the information gained from this study can be used to improve the surgical experience for future patients, their families, and caregivers. We hope that sharing our study's significant findings with provincial policymakers will ensure ongoing support for the adoption of a POD prevention pathway across all Saskatchewan hospitals.

Recommendations: N/A

Implementing TEG-Guided Algorithm for Management of Bleeding in Cardiac Surgery Patients

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Background: Postoperative bleeding is the most common complication of cardiac surgery and is associated with increased morbidity and mortality. The bleeding can be multifactorial and often involves a coagulopathy. Thromboelastography (TEG) enables rapid, functional assessment of coagulation and can be utilized to guide targeted management of bleeding.

Research Question(s) or Hypothesis: In adult cardiac surgery patients with coagulopathy and moderate bleeding, does implementing a TEG-guided management algorithm reduce PCC transfusion rates?

Methods/Methodology: Retrospective cohort study of adult cardiac surgery patients with coagulopathic bleeding at Royal University Hospital. Exclusion criteria includes pre-existing coagulopathy, intraoperative mass transfusion, and patients with prior cardiac surgery operations. The intervention is that a TEG-guided management algorithm will be posted in cardiac OR and ICU. Data collection will be completed via retrospective review of medical charts and transfusion laboratory data. Pre- and post-algorithm implementation data of outcome variables described in objectives will be analyzed via t-test and chi-square test for statistical significance.

Expected Results: We expect that the number of PCC administrations and plasma transfusions per patient will decrease after implementation of TEG algorithm. We expect that there will be no differences between chest tube output, surgical re-explorations, length of ICU admissions between pre- and post-algorithm implementation. We expect there will be less thromboembolic events in post-algorithm group.

Expected Conclusions: These results would demonstrate that TEG guided algorithms are beneficial for managing the complex coagulopathic bleeding that can arise during cardiac surgery. While providing better outcomes for our patients, we also recognize the benefits of preserving the blood bank reserves, saving healthcare costs, and improving efficiency in the OR without compromising hemostasis.

How Fresh Is Your Doctor? Recovery of Anesthesiologists' Cognitive Function After Night Call Shifts

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Background: Many physicians, including anesthesiologists, work overnight shifts, which disrupt sleep and are associated with poorer cardiovascular health and mental health, as well as an increased risk of chronic disease. Sleep deprivation impairs cognitive performance, alertness, mood, and response times in healthcare providers, with potential consequences for patient safety. Although scheduling strategies such as eliminating 24-hour call may reduce errors, the time course of cognitive recovery after extended shifts remains poorly understood. This limits the ability to provide evidence-based guidance on safe return-to-work timing after overnight call.

Research Question: Among Saskatchewan anesthesiologists and anesthesia residents working overnight call shifts, how does cognitive performance change following overnight call, and how long does it take to return to baseline? This study will also examine whether subjective recovery aligns with objective cognitive performance, and how sleep, workload, and recovery behaviors influence cognitive recovery.

Methods: We will conduct a prospective longitudinal repeated-measures study of anesthesiologists and anesthesia residents working overnight call shifts. Participants will serve as their own controls. Objective cognitive performance will be measured using the Cambridge Neuropsychological Test Automated Battery (CANTAB) spatial working memory test. Subjective recovery will be assessed using the Karolinska Sleepiness Scale and a recovery visual analog scale. Measurements will be collected at baseline, pre-call, post-call, and follow-up time points during the recovery period. Data will be analyzed using repeated-measures analysis of variance and correlation analyses to assess changes over time and the relationship between subjective and objective recovery.

Expected Results: We expect cognitive performance to decline after overnight shifts and to improve following recovery sleep. We also anticipate that participants' subjective sense of recovery may not fully align with objective cognitive performance. This study will describe the pattern and duration of cognitive recovery after overnight call and identify factors associated with delayed or incomplete recovery.

Expected Conclusions: This study will help clarify how overnight call affects cognitive performance in anesthesiologists and anesthesia residents, and how long recovery takes after a night call shift. By comparing objective cognitive testing with subjective recovery measures, the findings may inform future work on scheduling, return-to-work practices, patient safety, and physician wellness.

Improving Aseptic Technique Compliance During Medication Preparation Among Anesthesiologists in Saskatoon: A Quality Improvement Initiative

John Perverseff; Carla Flogan; Mary Ellen Walker; Brian Woytowich

Background: Healthcare-associated infections (HAIs) linked to aseptic technique lapses during anesthesia medication preparation represent a preventable patient safety risk. Operating room contamination rates (1–21%) are approximately 100-fold higher than pharmacy standards. Hand hygiene compliance is as low as 2.2% before aseptic tasks globally, and 83% of Canadian anesthesiologists report sharing medication vials between patients, contravening CAS, ASA, and ASRA guidelines. No Canadian QI study with direct observational aseptic technique data currently exists.

AIM: Within 12 months, increase the proportion of staff anesthesiologists and anesthesiology residents at Royal University Hospital, St. Paul's Hospital, and Saskatoon City Hospital demonstrating compliance with recommended aseptic technique during medication preparation from an established baseline to ≥70%, measured by observational audits and surveys, using a PDSA framework.

Methods/Methodology: This QI project uses PDSA cycles over 12 months evaluating vial septum cleaning, sterile syringe use, appropriate glove use, and hand hygiene. Baseline assessment includes: (1) a focus group with fishbone diagram analysis; (2) an anonymous survey with optional CAS-wide distribution via DARE Award; and (3) a direct observational audit using a validated checklist by trained medical student observers. The intervention comprises laminated workstation reference sheets and infographic posters summarizing CAS/ASA aseptic medication preparation guidelines. Follow-up occurs at 2-month intervals. Analysis includes descriptive statistics, χ^2/Fisher's exact tests, run charts, and thematic analysis.

Results/Findings: Baseline compliance is anticipated to be <50%, consistent with international data. Following intervention, an upward compliance trend is expected across PDSA cycles, with secondary improvements in provider guideline knowledge and medication preparation consistency.

Discussion: N/A (Not Available at this Time.)

Conclusions: This project will have answered its AIM if run charts show a significant improvement and ≥70% of providers meet targeted steps at Month 12, confirming that a low-cost intervention produces measurable, sustained improvement in a Canadian academic centre.

Recommendations: N/A (Not Available at this Time.)

Understanding Patient and Family Experiences in ICU Clinical Trial Participation: A Qualitative Journey Mapping Study

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Background: Clinical trials are essential for advancing evidence-based practices. However, participation in intensive care unit (ICU) research occurs within a complex and emotionally charged environment. Critically ill patient often lack decision making capacity, requiring family members or substitute decision makers to engage with research during periods of uncertainty or distress. Existing literature highlights disparities in trial participation and identifies factors such as trust, communication, and timing as important influences. However, prior research has largely focused on discrete components of research participation, particularly consent and enrollment, with limited attention to the broader, evolving experience of patients and families across the entire research trajectory.

Research Question(s) or Hypothesis: Among adult ICU patients and family decision makers who are approached for participation in ICU clinical trials (regardless of consent), what are their lived experiences and perceptions across the research journey? This study also aims to identify key emotional, cognitive, and contextual factors shaping these experiences over time.

Methods/Methodology: We will use a mixed-methods approach where we will use qualitative and quantitative methods sequentially to explain and explore the ICU research journey. Our study will use human-centered design and pragmatism to understand real-world issues and find useful and actionable answers. We will create a preliminary research journey map with research coordinators and patient family partners affiliated with the Canadian Critical Care Trials Group and further validate these preliminary findings with a national workshop of patients and families approached to consent in ICU clinical trials. The workshop facilitator will capture findings on a virtual whiteboard and analyze the findings qualitatively using an inductive thematic analysis. We will also include a low-barrier anonymous participation/non-participation study to collect basic reason(s) for participation or non-participation in ICU clinical trials, as well as demographic data for all patients and families asked to participate.

Expected Outcomes: We will co-create a journey map of ICU research participation, including ICU admission, research approach, decision-making, participation, and post-ICU reflection. Key themes are expected to extend beyond consent to encompass emotional burden, evolving perceptions, and relational dynamics over time. Trust, communication, and timing are anticipated to remain important. Potential differences in experiences across sociodemographic groups may also emerge.

Expected Conclusions: This study is expected to demonstrate that ICU clinical trial participation is a dynamic and evolving experience shaped by emotional, relational, and contextual factors across the patient and family journey, and that understanding this trajectory is essential for improving patient-centered and equitable research practices.

Geographic Inequity and Travel Burden in Pediatric Appendectomy Care in Saskatchewan

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Background: Pediatric appendicitis is the most common surgical emergency in children, and many rural families must travel for their child to undergo an appendectomy. Travel for pediatric surgical care has been associated with increased costs and psychosocial stress for caregivers and families. Anecdotally, rural families who come to Saskatoon for this surgery report significant stress related to travel, accommodation, and lost wages. There is currently no clear provincial data on the number of pediatric appendectomies performed in rural/regional centers versus tertiary centers such as Saskatoon, nor the impact travel has on these families.

Research Questions: What is the geographic distribution of pediatric appendectomies across Saskatchewan? How far do patients travel to have this procedure performed? How are caregivers impacted by travel from out-of-town to Saskatoon for pediatric appendectomy?

Methods/Methodology: This will be a multi-method study involving two parts. The first part will be a retrospective analysis of all pediatric (age <18) appendectomies that occurred in Saskatchewan between 2024 and 2025, using descriptive analysis to compare the number of surgeries in urban versus rural centers and average travel distance to surgery. The second qualitative portion will involve prospective semi-structured phone interviews with caregivers of pediatric appendectomy patients who traveled to Saskatoon from out-of-town, using a grounded theory paradigm to identify themes from their experiences.

Results/Findings: Expected Outcomes: Our expected results are that, between 2024 and 2025, a high proportion of pediatric appendectomies occurred in Saskatoon, a significant number of patients traveled a long distance to receive care, and caregivers found travel for surgery to be a significant burden.

Discussion: N/A (Not Appropriate - Not Available at this Time.)

Conclusions: Expected Conclusions: The majority of pediatric appendectomies in Saskatchewan between 2024 and 2025 are expected to have occurred in Saskatoon, with many patients traveling a long distance for surgery. Travel for this procedure is expected to be burdensome for caregivers. These findings may influence future surgical resource planning in Saskatchewan so that pediatric patients can have appendectomy care closer to home.

Recommendations: N/A (Not Appropriate - Not Available at this Time.)

Bringing pain reprocessing therapy to Saskatchewan: a knowledge mobilization study

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Background: With an estimated 8 million Canadians living with chronic pain, this condition reflects a significant healthcare and a quality-of-life burden.[1] Chronic pain often persists despite medical and surgical management. Traditional psychosocial therapies are receiving renewed interest as possible treatment modalities, but evidence has yet to show sustained significant improvement. Pain Reprocessing Therapy (PRT) is a promising modality that has demonstrated early efficacy in significantly reducing chronic pain symptoms, with benefits sustained over the long term. Initial studies are promising but more research in this area is required. Saskatchewan has a limited number of PRT providers, and the availability of this treatment is not well known by many healthcare practitioners and patients living with chronic pain in the province. We undertook the present study to create a knowledge mobilization campaign and evaluate its reach, engagement and efficacy in improving PRT awareness and interest in uptake.

Research Question: Will our knowledge mobilization campaign be well received and serve as an effective way to reach and engage with healthcare providers and patients living with chronic pain in the province of Saskatchewan to increase the awareness of PRT and increase self-reported uptake of PRT?

Methods/Methodology: Our knowledge mobilization campaign will consist of a subpage on the SaskPain.ca website, including an informative video and podcast episode, as well as a SaskPain newsletter, community outreach visits and practitioner webinars. This is a multi-methods study evaluating the knowledge mobilization campaign in two populations, patients living with chronic pain (n=100) and healthcare providers (n=100). To account for potential bias in the public sample, a secondary group of patient partners with chronic pain (n=14) will also complete the survey. Data collection will include digital engagement rates and distributed surveys. Primary endpoints include reach, engagement, and self-reported awareness and interest in PRT uptake. Secondary endpoints include barriers, future directions, and overall themes.

Expected Results: The knowledge mobilization campaign is expected to be well understood and received by healthcare providers and patients living with chronic pain. Any areas for improvement will be identified via survey feedback. We anticipate surveys will demonstrate an increased self-reported interest in, understanding of, and awareness of PRT, as reflected by intentions to pursue training, increased referral practices, and patient interest in seeking PRT practitioners. Survey feedback will include open-ended questions regarding barriers, concerns, and ideas that offer creative areas for future directions or improvement.

Discussion: N/A.

Expected Conclusions: We expect that the knowledge mobilization activities will result in measurable campaign reach and engagement, enhance interest and awareness of PRT, as well as identify areas for improvement and future directions.

Recommendations: N/A.

A Quality Improvement Project to Improve Documentation and Follow-Up of Perioperative Atrial Fibrillation After Noncardiac Surgery at Regina General and Pasqua Hospitals

Authors: Huzaifa Saeed, MD; Payam Dehghani, MD; Neha Mehta, PhD; Sabiha Sultana, MBBS

Background: Perioperative atrial fibrillation (POAF), defined as new-onset atrial fibrillation (AF) of ≥30 seconds' duration within 30 days of noncardiac surgery in a patient without prior AF, affects 2–3% of surgical patients and up to 20% after thoracic procedures. POAF confers a 3.43-fold increased one-year ischemic stroke risk, yet fewer than one in four patients receives oral anticoagulation at discharge. No structured process currently exists at Regina General Hospital (RGH) or Pasqua Hospital (PH) for systematic CHA_2DS_2-VASc documentation or guideline-concordant follow-up referral.

Research Question: At RGH and PH, can an electronic health record (EHR)–based alert system, refined through sequential Plan-Do-Study-Act (PDSA) cycles, increase the proportion of adult noncardiac surgical patients with new-onset POAF who receive both a documented CHA_2DS_2-VASc score and a documented referral to cardiology or internal medicine to ≥80% within 18 months?

Methods: Two-site quality improvement (QI) project using the Institute for Healthcare Improvement Model for Improvement with sequential PDSA cycles over 18 months (April 2026–September 2027). Eligible patients are adults (≥18 years) with new-onset POAF within 35 days of noncardiac surgery requiring at least an overnight admission, aligning with ASPIRE-AF inclusion criteria. Phase 1 comprises an anonymous REDCap baseline survey of ~45 attending anesthesiologists at RGH and PH (target ≥80% response) and a 12-month retrospective chart review quantifying the pre-intervention proportion of POAF patients with documented CHA_2DS_2-VASc scoring and cardiology or internal medicine referral. Phase 2 implements an EHR-based POAF alert with a structured documentation and referral template, refined through three sequential PDSA cycles iteratively optimizing alert trigger logic, clinician workflow integration, and referral pathway uptake.

Expected Outcomes: Baseline data are expected to reveal substantial underutilization of systematic POAF documentation and referral. The primary outcome is the proportion of eligible POAF patients with both a documented CHA_2DS_2-VASc score and documented cardiology or internal medicine referral; PDSA-driven refinement is anticipated to increase this composite measure to ≥80%.

Discussion: Success will narrow a documented evidence-practice gap in the Saskatchewan perioperative context and provide a replicable provincial model aligned with ongoing national POAF anticoagulation research.

Expected Conclusions: A pragmatic EHR-based QI intervention is expected to improve guideline-concordant care for POAF in southern Saskatchewan.

Recommendations: N/A (Not Appropriate – Not Available at this time).

FPA Abstracts

Pyxis-Programmed Anaphylaxis Kit to Improve Testing of Suspected Intraoperative Anaphylaxis: A Quality Improvement Project

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Members of the Research Team, Dr. Richard Schaan, Darcie Earle
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Background: Intraoperative anaphylaxis is rare but potentially fatal. Confirming the diagnosis depends on timely serum tryptase sampling and proper documentation, yet these steps are often missed. National audit data show that guideline-concordant tryptase sampling is not consistently achieved.[1] Without a standardized approach, diagnoses may be missed, triggers go unidentified, and patients face avoidable risk during future anesthetics.
Question(s): Does implementation of a Pyxis-programmed Anaphylaxis Kit improve adherence to recommended diagnostic testing, documentation, and follow-up planning for suspected intraoperative anaphylaxis? This project primarily addresses safety and effectiveness.

Methods: This quality improvement project (PDSA Cycle 1) used a pre–post design in SHA operating rooms. The intervention was a Pyxis-programmed Anaphylaxis Kit bundling key emergency medications (epinephrine, diphenhydramine, famotidine, methylprednisolone) with an embedded cognitive aid checklist. Cases were identified through anesthesiologist self-report and laboratory records. Data collected included tryptase ordering, timing, documentation, and follow-up. An anonymous survey of pediatric anesthesiologists (10/16, 62.5%) assessed awareness, usefulness, and suggestions for improvement. This project was granted exemption by the University of Saskatchewan Research Ethics Board (E-BIO-111).

Results: Pre-implementation review identified 3 cases: tryptase was ordered and documented in 2/3 (67%). One case had no tryptase ordered, no anaphylaxis documented, and no follow-up plan. One post-implementation case has occurred so far—tryptase was ordered and anaphylaxis was documented, though some data fields are still pending. On the survey, 100% rated the kit as useful (50% extremely, 40% very, 10% somewhat), 100% agreed the medications were appropriate, and 90% wanted a weight-based dosing chart included.

Discussion: Because intraoperative anaphylaxis is uncommon (~5 cases/year locally), early evaluation focuses on usability and adoption rather than clinical outcomes. Survey responses suggest the kit helps standardize crisis management and reduces cognitive burden. The inconsistency seen in pre-implementation data supports the rationale for this kind of structured approach.

Conclusions: A Pyxis-programmed Anaphylaxis Kit is a practical, well-received intervention that can support the management of intraoperative anaphylaxis at the point of care.

Recommendations: Next PDSA cycles should add a weight-based dosing chart and tryptase blood tubes based on survey feedback, with continued data collection and expansion to other SHA sites.

References:
1. Harper NJN, Cook TM, Garcez T, et al. Anaesthesia, surgery, and life-threatening allergic reactions: summary of the NAP6 investigation. Anaesthesia. 2018;73(8):1013–1022.

Investigating Hypocalcemia in Trauma Patients: Trends in Detection and Treatment Timelines at RUH

Authors: Chiranjeevi Gade, Troy Simpson, Matt Johnson

Background: Hypocalcemia is common in critically ill trauma patients and contributes to coagulopathy, impaired cardiac contractility, and poor outcomes. It may result from hemorrhage, citrate chelation during transfusion, and acid–base disturbances. Despite its clinical importance, the timing of detection and adequacy of calcium replacement in acute trauma care remain unclear.

Objective: To determine the local incidence of hypocalcemia in Level 1 trauma patients at Royal University Hospital (RUH), assess timelines for its identification and treatment, and evaluate the effectiveness of calcium replacement.

Methods: A retrospective chart review of 150 Level 1 trauma patients presenting to RUH between July 2024 and August 2025 was conducted. Data were extracted from electronic and paper records, including laboratory timelines, transfusion data, and medication administration records. Injury severity was categorized using the Injury Severity Score (ISS). Primary outcomes included incidence of hypocalcemia, time to detection, time to calcium administration, and persistence of hypocalcemia after treatment.

Results: Hypocalcemia was identified in 26/150 patients (18%) on presentation. Among these, 20 patients received calcium replacement; however, all remained hypocalcemic afterward. Fourteen patients with hypocalcemia received no treatment. Notably, hypocalcemia preceded transfusion in 11 cases. Laboratory turnaround times varied significantly (lab order to reporting: 21–120 minutes total). Blood transfusion was more common in major trauma (ISS >15), with 31/65 such patients receiving blood. Calcium dosing ranged from 1–9 g of calcium gluconate. One patient presented with hypercalcemia and died.

Discussion: Hypocalcemia occurs early in trauma and is not solely transfusion-related. Delays in laboratory reporting and inconsistent repeat testing may contribute to under-recognition. Current replacement strategies appear inadequate, as most treated patients remained hypocalcemic. These findings highlight a gap in timely correction and suggest that earlier, protocolized calcium administration may be necessary.

Conclusion: Hypocalcemia is frequent and often undertreated in trauma patients at RUH. Improvements in rapid detection and standardized calcium replacement—potentially integrated into massive transfusion protocols—may enhance patient outcomes.
Future Directions: Further research will evaluate associations between hypocalcemia rates, potential mortality, and morbidity strictly due to hypocalcemia, and support implementation of calcium-inclusive trauma order sets.

Student Abstracts

Utility and Impact of Repeat Neuroimaging Under Anesthesia in Children with Neurodevelopmental Conditions

Authors: Grace Braaten BSc, Muhammad Awan MPH, Mary Ellen Walker PhD, Jennifer O'Brien PhD, Sheldon Wiebe MD, Jonathan Gamble MD

Introduction: Magnetic resonance neuroimaging (nMRI) is frequently repeated in children with autism spectrum disorder (ASD), global developmental delay (GDD), epilepsy, and cerebral palsy (CP), despite a low probability of identifying new abnormalities and guidelines that discourage repeat imaging. These studies strain MRI and anesthesia resources, and their diagnostic yield in Saskatchewan is unknown. This study evaluates the diagnostic yield, risks, and family impact of repeat nMRI under general anesthesia in children with neurodevelopmental conditions.

Methods: We conducted a mixed-methods study including a 10-year retrospective review of all children in Saskatchewan with repeat nMRIs for ASD, GDD, epilepsy, or CP who underwent at least one anesthetized scan. Prospective interviews are ongoing to explore caregiver expectations and burdens such as travel time and distance, missed days of work, and out of pocket expenses.

Results: The retrospective analysis demonstrated that 69.1% of repeat nMRIs did not reveal new relevant findings and that 32.4% of repeat nMRIs were ordered against guidelines. On initial scans, patients with a study indication of CP were more likely to have significant findings than patients without a study indication of CP ($p=0.042$). In subsequent scans, patients with a study indication of CP were more likely to have a repeat scan against guidelines and patients with a study indication of GDD were more likely to have new significant findings on nMRI compared to patients without these study indications ($p=0.020$, $p=0.048$). Additionally, adverse anesthesia events were uncommon, with emergence delirium (7.6%) and nausea/vomiting (0.9%) being most frequent. Preliminary prospective data suggest that rural travel requirements and missed work hours contribute to family burden.

Discussion: Repeat nMRIs in children with neurodevelopmental conditions are often ordered against guidelines and frequently yield no new relevant findings, demonstrating nMRI's limited clinical utility. Enhancing physician education and improving adherence to imaging guidelines when ordering these nMRIs is essential to optimize resource allocation, reduce family burden, and avoid unnecessary risk for patients. nMRI requests for ASD, GDD, epilepsy and CP should be preceded by careful evaluation of diagnostic value and impact on management. Sole reliance on radiologists during protocoling is insufficient, especially when requests are vague.

Postoperative cognition in elderly patients, is there an association with their preoperative baseline?

Authors: Nicolas Henao-Romero, Mary Walker, Darcie Earle, Peter Hedlin

Introduction: Cognitive deficits following surgery such as perioperative cognitive dysfunction (POCD) and post-operative delirium (POD) are common post-operative complications among older adults. POCD affects 15-60% while POD has an incidence of 40% in patients ≥ 65 years of age. (Feng et al., 2025; Inouye et al., 2014). The etiology of these conditions has been associated with socioeconomic as well as biological factors (Li et al., 2025; Yu et al., 2025). Therefore, this study aimed to examine the risk factors associated with cognitive decline after surgery.

Methods: The study cohort consisted of 25 elderly patients (≥60 years of age) who underwent preoperative consultation at the Pre-Assessment Clinic at the Royal University Hospital (RUH). Patients completed the Montreal Cognitive Assessment (MoCA) as well as the Edmonton Frailty Scale (EFS). Following surgery, they were reassessed with an alternate version of the MoCA and the Confusion Assessment Method (3D-CAM and CAM-ICU). Finally, a retrospective chart review was conducted for each patient.

Results: The study cohort consisted of 25 patients, 17 males and 8 females, with a mean age of 71.0 years (71.9 years for males and 70.0 years for females). The most common type of surgery was cardiac (52.0%, n = 13), followed by general surgery (28.0%, n = 7), neurosurgery (16.0%, n = 4), and orthopedic surgery (4.0%, n = 1). Postoperatively, two patients (8.0%) screened positive for delirium on the Confusion Assessment Method (ICU and/or 3D-CAM).

Postoperatively, patients demonstrated significant declines in delayed recall. The total MoCA score and the MoCA memory index (MIS) also decreased significantly following surgery. Additionally, A significant negative correlation was observed preoperatively, indicating that higher frailty was associated with lower cognitive performance before surgery. Postoperatively, this relationship was no longer statistically significant

Discussion: This study demonstrates that elderly surgical patients experience significant postoperative declines in global cognition as well as in delayed recall. Preoperatively, higher frailty was associated with poorer cognitive performance, as measured by MoCA, suggesting that frailty is an important predictor of baseline cognitive vulnerability. These findings highlight the need for preoperative frailty and cognitive screening to identify at-risk patients and to guide perioperative management strategies aimed at reducing postoperative cognitive dysfunction.

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Anesthesia Quality Improvement for Residents (AQuIRe): Program Evaluation

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Introduction: Quality improvement (QI) is a mandated core component in most post-graduate residency training and described as an essential facet of healthcare delivery and patient care[1]. However, the University of Saskatchewan, College of Medicine's current Residency Quality Improvement Program (RQIP) curriculum was outdated, impersonal, and unaligned with best practice. Thus, the Provincial Department of Anesthesiology developed the Anesthesia Quality Improvement for Residents (AQuIRe) program to address these gaps and provide a personalized QI curriculum for anesthesia residents. It also sought to evaluate AQuIRe's effectiveness on improving residents' QI knowledge, skills, confidence, and identify future recommendations.

Methods: AQuIRe was developed from RQIP, undergoing a thorough revision process and delivered to PGY2 anesthesia residents (n=9). Program evaluation used a mixed-method design, integrating BASiC-QI and post-workshop surveys, structured rubrics, and qualitative feedback, across two evaluation frameworks (Kirkpatrick and RE-AIM). Minimum targets were set for improved knowledge and application ($\geq$80%), project quality ($\geq$80%) demonstrating strong QI application, overall satisfaction ($\geq$90%) and long-term impact ($\geq$1 projects scaled). Real-time program adaptations and future recommendations for improvement were collated using an environmental scan of comparable North American programs, literature review, and resident/faculty feedback.

Results: AQuIRe demonstrated strong alignment across the Kirkpatrick and RE-AIM frameworks. All targets were met, with BASiC-QI showing 91.7% of residents reported improved knowledge and confidence. Post-workshop surveys found 91.3% reported improved understanding and application, 100% reported overall satisfaction and confidence applying skills to practice immediately. Project rubrics showed 100% of residents demonstrated strong QI application. One group is scaling their project, showing evidence of long-term engagement. In the 6-month post-course survey, 91.7% of residents reported confidence in knowledge, continued interest, and greater application of QI to their daily work than pre-AQuIRe. Additionally, departmental support and interdepartmental interest reflect positive shifts in institutional priorities.

Discussion: AQuIRe offers a personalized and effective QI curriculum for anesthesiology residents. Residents reported improved skills, confidence and demonstrated strong application. Strengths include its structured, personalized, practice-based approach and alignment with evaluation frameworks, while limitations include the small sample size and short evaluation timeframe. Future recommendations include refining learning materials, expanding resources and dissemination opportunities, recruiting resident facilitators, and longitudinal reinforcement.

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CAS Essay Contest Winners- Essays

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The Anesthesiologist's Role in Undergraduate Medical Education

The anesthesiologist has historically played a minor, often peripheral role in undergraduate medical education (UGME), particularly during the pre-clerkship years. Traditionally, the specialty's expertise was perceived as too technical, too high-stakes, or perhaps too narrow for the generalist-focused foundation of early medical training. However, as medical education undergoes a progressive shift toward integrated, competency-based curricula, this perception is no longer merely outdated. Rather, it is an active barrier to producing well-rounded, physiologically grounded physicians. As a third-year medical student and someone who, in a former life, served as a health professions educator with a Master of Education, I believe the anesthesiologist is uniquely positioned to serve as a primary synthesizer of basic and clinical sciences within the undergraduate medical curriculum. By bridging the gap between theoretical knowledge and clinical application, reclaiming a central role in foundational clinical skills, and leading the charge in medical simulation, the anesthesiology department can transform from a peripheral elective to the very foundation of undergraduate medical training.

Advocating for greater involvement of anesthesiologists in the UGME curriculum should begin by addressing a significant and persistent educational gap in Canadian medical schools. Research has indicated a stark disparity between faculty size and educational contribution. While anesthesiology departments are often among the largest in medical faculties, their contribution to total pre-clerkship teaching hours is often less than 1% (1). In a study examining the role of anesthesiologists in pre-clerkship, Dr. Viren Naik described this statistical underrepresentation as "a missed opportunity". He suggested that anesthesiologists are failing to provide students with transformative experiences that define a physician's understanding of acute care and early-career trajectory, which he termed "sentinel moments," potentially losing strong applicants to specialties with greater curricular involvement. (2). Even for the undifferentiated learner, the operating room and an anesthesiologist should not be viewed merely as an opportunity to perform technical procedures such as intubation or intravenous access. Instead, the specialty must improve its approach to teaching the core aspects of the field to all future doctors, whether they ultimately pursue anesthesia or another perioperative patient management specialty (3). To achieve this, the operating room must be reframed in the curriculum as a living laboratory where the abstract concepts, such as cardiovascular and respiratory physiology, are applied and managed in real time.

The true value of the anesthesiologist in the curriculum lies in their deep, interconnected knowledge of multi-organ system physiology and their ability to provide immediate interventions based on that knowledge. In a traditional classroom setting, students learn about conditions such as Aortic Stenosis, COPD, or Down Syndrome as discrete entries in a pathology textbook. However, under the guidance of an anesthesiologist, these diagnoses become dynamic management challenges. For a student pursuing general practice, aortic stenosis may present as a murmur that should be noted for eventual referral. However, for an anesthesiologist, it is a high-stakes lesson in the fixed cardiac output and the critical need to maintain systemic vascular resistance and preload. Similarly, a patient with Down Syndrome is not just a collection of phenotypic traits, but a real-world lesson in the interplay between macroglossia and atlantoaxial instability during airway management. When an anesthesiologist teaches these concepts, they demonstrate how a patient's baseline condition directly affects clinical decision-making. This approach

to patient encounters allows students to move beyond rote memorization of what a disease is toward how it behaves under the stress of an intervention. This skill is as relevant in a rural clinic as in a tertiary-care trauma bay.

Beyond the classroom and the operating room, anesthesiologists are underutilized in teaching foundational clinical skills, particularly the art of physical examination and preoperative risk stratification. A preoperative assessment is a focused yet comprehensive evaluation of a patient's functional reserve, determining their ability to tolerate the acute physiological stress of surgery, which contrasts with internal medicine's emphasis on long-term disease management (3). Teaching medical students to perform these focused, systems-based assessments provides them with a toolkit for identifying the critically ill patient before the monitors begin to alarm. By participating more actively in clinical skills modules, anesthesiologists can help students understand that a preoperative consult is not just a checkbox for surgery, but an intensive investigation into the survival and recovery implications of a patient's comorbid conditions.
As someone with a career foundation in health professions education, I strongly believe that medical simulation is perhaps the most vital tool in medical education for bridging the gap between theory and practice. Anesthesiology has long been a pioneer and expert in Simulation-Based Medical Education (SBME), yet this expertise is frequently siloed within postgraduate residency programs. Hamlin et al. highlighted that despite the specialty's leadership in simulation, anesthesiologists remain underrepresented in the pre-clerkship environment where these skills are first learnt (1). In the past few decades, evidence has demonstrated not only academic and performance benefits of simulation for UGME students, but also positive perceptions and a desire for more of it (4,5). Therefore, there is increasing demand for students to have psychologically safe environments in which to apply their knowledge of pharmacology and physiology and receive meaningful, productive feedback. The anesthesiologist is well-equipped to meet this demand. Through simulation, anesthesiologists leverage their skills as OR Theatre managers to develop Crisis Resource Management (CRM) skills, such as closed-loop communication and leadership under pressure. In a simulated environment, a student can administer a vasopressor and observe the immediate effect on hemodynamics or manage a difficult airway and understand the anatomical consequences of their choices, without risking a patient. I believe that, through their proficiency in SBME, paired with their expert clinical knowledge, clinical skills, and non-technical skills, anesthesiologists are well-positioned to support UGME learners in transitions from knowledge to action and to develop well-rounded competence (6).

The role of the anesthesiologist also extends to the humanistic and perioperative side of medicine. The perioperative period encompasses a vast spectrum of care, including preoperative optimization, the ethical complexities of end-of-life care in the ICU, and the management of the opioid crisis through acute pain services. By integrating these topics into the core undergraduate curriculum, anesthesiologists can demonstrate their role as perioperative physicians who care for the whole patient. Within the surgical environment, this introduces a conceptual shift for the learner, that while the surgeon focuses on treating the pathology, the anesthesiologist focuses on treating the patient. This perspective is essential for students in any specialty, emphasizing the collaborative and interdisciplinary nature of modern healthcare and challenging the stereotype behind the “ether screen” by presenting the anesthesiologist as a vital consultant and patient advocate. (7). This advocacy is particularly important in an era of increasing surgical complexity and aging populations, when generalist physicians must understand the long-term implications of surgical interventions. By further integrating anesthesiology into the UGME curriculum, students can learn from experts in perioperative medicine to better understand these complexities and advocate for their patients, ensuring optimal outcomes in this high-stakes, vulnerable interaction with the healthcare system.

The further integration of anesthesiology into the modern UGME curriculum is not solely a strategy for attracting specialty recruits; it is crucial for enhancing the quality and safety of graduating physicians. Anesthesiologists, as experts in clinical physiology, bridge the gap between surgery and medicine through applied science. They equip students with foundational skills in resuscitation, clinical reasoning, and patient safety, which are fundamental to the development of any competent physician. As Canadian medical education institutions move toward more longitudinal and integrated models, it is imperative that the specialty advocate for a curriculum that seamlessly incorporates anesthesiologists' expertise throughout the undergraduate years. By introducing anesthesiologists and their extensive clinical knowledge and skills earlier in the UGME curriculum and providing a longitudinal educational experience, we can offer essential, life-saving instruction that considers the patient as a whole. This approach will also foster an optimal environment for early UGME learners to thrive and become safe, competent physicians.

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Experience Makes the Anesthesiologist: Simulation as a Bridge to Mastery

In anesthesiology, seconds can determine patient outcomes during intraoperative crises. Preparing clinicians for rare but life-threatening events requires more than traditional teaching; it demands realistic, high-stakes practice without risking patient safety. Recognizing early the need to manage high-risk clinical situations with precision and reliability, anesthesiology has emerged as a leader in patient safety and medical education. This focus on safety and performance helped drive the specialty's early adoption of simulation-based training, which provides a safe environment for learners to prepare for critical scenarios without compromising patient care.[1] The ongoing need for rapid and effective responses to rare but life-threatening events has further propelled the specialty toward innovative educational strategies beyond traditional didactic teaching.[2] Consequently, simulation-based education has become a cornerstone of anesthesiology training, offering immersive, high-stress environments in which learners can develop procedural skills, clinical judgment, and crisis management abilities.[3] Simulation has played an important role in medical education since the 1960s, and ongoing technological advancements continue to enhance its educational effectiveness and accessibility.[4]

Continued development in simulation technology has broadened the scope of its use in anesthesiology training. Simulation in anesthesiology has evolved substantially over time, particularly with the development of high-fidelity simulators capable of replicating complex physiological responses.[5] Modern full-body mannequins can simulate breath sounds, heart tones, pulses, pharmacologic responses, and critical perioperative events, all controlled through computer-based systems to recreate authentic clinical scenarios.[6] More recently, advancements in technology, including virtual reality (VR) and immersive simulation, have expanded the educational toolkit available to anesthesiology educators.[7] These innovations have enabled distance learning, enhanced scenario realism, and facilitated training in areas such as doctor-patient communication and interprofessional collaboration.[7] Although simulation-based education has not yet been universally standardized, it has become an important component of anesthesiology training in Canada. Currently, simulation-based education is commonly used to teach airway management, perioperative crisis response, and non-technical skills such as communication and teamwork, often in interprofessional settings. However, a recent national survey of Canadian anesthesiology residency programs found that while most programs incorporate simulation-based medical education into their curricula, considerable variability remains in access, frequency, and scope of simulation training across institutions.[8] Some programs reported limited or inconsistent exposure, highlighting ongoing disparities in educational resources and implementation.

Evidence supports the educational value of these practices. Simulation training has been shown to improve anesthesia trainees' ability to recognize and manage critical events more rapidly and effectively compared with traditional teaching methods alone.[9,10] Simulation-based assessments have also demonstrated the ability to differentiate performance across levels of training, suggesting a role not only in education but also in objective evaluation of clinical competence.[11] Beyond technical performance, exposure to simulation has been associated with reduced learner stress and anxiety during high-stakes clinical scenarios,[9] potentially enhancing learning and confidence prior to real patient encounters. Collectively, these findings highlight both the benefits of simulation in anesthesiology education and the need for more consistent integration across training programs.

As medical education continues to shift toward competency-based frameworks and technology-enhanced learning, the role of simulation in anesthesiology education is expected to expand even further. In several countries, simulation has progressed beyond a supplementary teaching tool and has become an established component of training and professional development. In the United States, the American Society of Anesthesiologists, in collaboration with the American Board of Anesthesiology, has formally incorporated simulation-based education into the Maintenance of Certification requirements, mandating participation in accredited simulation activities to support ongoing competence and patient safety.[12] Similar emphasis on simulation exists internationally. In the United Kingdom, the Royal College of Anesthetists integrates simulation into anesthesiology through structured curricula with a focus on crisis management and non-technical skills.[13] In Australia and New Zealand, simulation activities are widely used and may contribute to continuing professional development requirements.[1,14] Several European countries, particularly Denmark, Netherlands and Ireland, among others, have established high-fidelity simulations as key tools for team training and patient safety initiatives.[15]

With the advancement of technology and evolution of simulation technologies, new possibilities are arising. Emerging applications of simulation include immersive VR environments for interprofessional education, adaptive learning platforms driven by artificial intelligence (AI), and objective competency assessment tools integrated into clinical training pathways.[7] Together, these developments suggest a growing role for simulation not only as a teaching modality, but also as a mechanism for assessment, standardization, and equity within Canadian anesthesiology training. VR and immersive simulation are becoming increasingly recognized as valuable tools in anesthesiology education. Compared with mannequin-based simulation, VR allows learners to engage in realistic three-dimensional clinical environments that can be accessed repeatedly and, in many cases, remotely. This helps to reduce reliance on physical simulation centres.[7] This approach is well-suited for anesthesia training as it allows for spatial awareness, procedural precision, and rapid physiological decision-making. VR-based simulation has been successfully applied to the teaching of airway management, fiberoptic intubation, regional anesthesia techniques, and ultrasound-guided procedures.[7] This allows trainees to practice complex psychomotor skills with extensive feedback in a controlled environment.[16]

Beyond procedural training, immersive simulation has been used to recreate complete perioperative scenarios, including induction of anesthesia, intraoperative crises, and postoperative complications, which supports experiential learning and clinical reasoning. VR environments can also facilitate interprofessional education by providing simulation of operating room team dynamics and communication, especially in high-stakes events, reinforcing non-technical skills such as leadership and situational awareness.17 Importantly, VR-based simulation may help address disparities in access to simulation training by providing standardized educational experiences across institutions, especially within rural Canadian teaching facilities. As these technologies continue to improve and become more affordable, they are likely to play further roles in complementing traditional simulation models and continue supporting competency-based anesthesiology education.[18]

AI represents another emerging advancement for the future of anesthesiology simulation training. AI-driven simulations can provide learners with real-time feedback, identify subtle errors and adapt scenario difficulty based on individual performance. This helps to create a more personalized and effective learning experience.[19] This aligns well with competency-based medical education systems as it allows progression to be determined by demonstrated competence rather than time-based exposure.[20] AI-assisted analysis of learner performance can strengthen post-simulation debriefing by identifying recurring errors or delays in decision-making that may be difficult to detect through human observation alone. For example, AI could objectively evaluate technical aspects of airway management, such as depth or positioning during endotracheal intubation, and highlight deviations from optimal techniques. By incorporating objective performance data into faculty-led debriefing, AI-driven simulations have the potential to enhance the educational value of feedback while preserving the essential role of expert educators.

Despite its potential educational benefits, simulation-based training is not without limitations. First, high-fidelity simulators, immersive VR platforms, and AI systems all require significant initial and ongoing financial investment, as well as dedicated facilities and staff. The initial investment may limit accessibility, especially for smaller or rural programs, and may risk widening existing gaps in educational opportunities.[1,8] Effective simulation training also depends on trained faculty who are not only skilled in clinical anesthesiology but also in the debriefing and facilitation of scenarios.[18] While simulations have been shown to improve performance in simulated conditions, further research is needed to determine the extent to which these gains translate into improved outcomes in clinical practice.[21] Furthermore, AI use in healthcare settings raises concerns regarding privacy and transparency in assessments. Relying on automated systems may also take away the realism of complex decision-making processes and risk oversimplification. Addressing these challenges is important to effectively integrate simulation technologies into anesthesiology training, and this can be done with the collaboration of institutions, faculty, and continued research.

Simulation-based training remains an important component of anesthesiology training, highlighting the specialty's long history of commitment to patient safety, innovation, and training excellence. High-fidelity mannequins have been used to train medical students and residents since the 1960s, and now emerging technologies such as VR and AI are further expanding the scope and effectiveness of simulation. While challenges related to cost, faculty availability, and ethical considerations persist, several evidence-based studies demonstrate that simulation-based training enhances clinical training instead of replacing human elements. As anesthesiology education continues to evolve in Canada, simulation-based training offers a great opportunity to improve equity, consistency, and educational quality across training programs. Embracing emerging and future applications of simulation will allow anesthesiology to further strengthen its leadership in medical education and continue its advancement in safe, high-quality patient care.

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Anesthesia In a Shifting Geopolitical Climate

Anaesthesia does not operate in a silo. The architype of an anaesthesiologist sitting behind a blue drape and exercising a calm mastery of physiology, insulated from the disorder of the outside world is a rather alluring fantasy. It suggests an isolated intellectual pursuit with technical control and professional autonomy untouched by social turbulence. However, this falls short of the far more interesting, but deeply complex and uncomfortable reality. The operating room is not a silo but rather an intricate and dynamic network.

To understand this, it is helpful to look to the discipline of Science and Technology Studies and the foundational work of Michel Callon and Bruno Latour (2001, 1983). They argued that scientific practice does not occur in isolation but rather as a dynamic network of “actor/actants” which are not only people, but also things like objects, technologies, or policies. In this way agency is not limited to humans but is determined by the actants ability to affect the network, and outcomes are produced from interactions in that network.

Anesthesia is also such a network, with the patient at its core. The patient is therefore an actor, who not only brings with them their physiology but also their lived experiences – trauma, trust or mistrust, socioeconomic background, and political beliefs – all of which affect their physiology, responses to care, and ultimately their outcomes. Similarly, the anesthesiologist carries with them their training, cognitive biases, and both moral and professional responsibilities. Furthermore, medications are not just passive tools but also actants in the network. For instance, the decision to use sugammadex vs neostigmine and glycopyrrolate reflects supply chains, patent law, geopolitical trading policies, healthcare budgeting and much more. Likewise, the equipment, such as the ventilator, is shaped by procurement and maintenance contracts, institutional budgets, software design, data infrastructure, billing and workflow requirements, and medico-legal risk management. These are among many examples of how Anesthesia sits at the convergence of this network.

Latour described Louis Pasteur’s laboratory as being at the intersection of such a network. It had the ability to translate micro-scale laboratory findings into macro-scale transformations of agriculture, medicine and public policy. Pasteur’s laboratory’s power was derived from its ability to collapse and expand the scale of the network (Latour, 1983). The operating room is similar. Anesthesia sits at the junction of physiology, pharmacology, technology, economics, politics, and culture. Its power lies in its ability to stabilize and shape the network to benefit the patient in their most vulnerable moments. However, when one node shifts the whole network responds. Therefore, Anesthesia is intrinsically linked to society and societal change.

In recent years there has been a substantial geopolitical shift, the USA-led unipolar world dominated by globalization and increasing free trade has slowly given way to a multipolar world, where the world is divided into several regions (Nederveen Pieterse, 2017) (O'Sullivan, 2021). Each region is led by a

central country or ‘pole’ with distinct economic policies, trading pattern, ideologies, cultural practices, and social structures. The COVID-19 pandemic accelerated this shift, as it laid bare the vulnerability of interdependence. With border closures, supply chain disruptions, and vaccine nationalism highlighting the fragility of the global system. Post-pandemic discourse often reframed healthcare issues under a security paradigm. Simultaneously, public trust in institutions, both medical and otherwise, diminished. Vaccine hesitancy proliferated, social media propagated misinformation, and intellectual expertise no longer held the same value.

The opioid crisis is one example of how these macro-level geopolitical shifts can affect micro-level clinical interactions. During COVID-19 Canada saw a significant increase in opioid-related mortality nationally (Government of Canada, Statistics Canada). Policy responses to the opioid crisis have demonstrated the shift towards security frameworks. Alberta recently enacted The Compassionate Intervention Act (Bill 53) which allows for the involuntary apprehension, temporary detainment and assessment for mandatory treatment of those with substance use disorders (Legislative Assembly of Alberta, 2024). Interestingly, the Alberta Medical Association stated that the current evidence does not clearly demonstrate that involuntary treatment benefits outweigh the risks and costs (2023). Therefore, such legislation is likely a reflection of the larger socioeconomic shift and the reframing of medical and social issues as threats which require a control rather than disorders which require trust-based interventions. This illustrated the reframing towards a security paradigm.

The paradigm shift enters the operating room via the patient. The patient is a conduit for society and therefore if trust in the medical system deteriorates at a societal level, then this can be seen at the clinical level as well. The patient may experience stigma, distrust in institution, and fear of coercion. This may also result in delayed presentation to care, more difficult consent processes, and altered pathophysiology. These changes are not abstract but are made manifest in the patient and recognizing this humanity is critical. Therefore, the network shifts.

Decades earlier Hannah Arendt described the modern division of the “laborer of the hand and the laborer of the head” (1958, pp. 90). This distinction supports a dangerous narrative of intellectual expertise in opposition to manual work. Physicians are symbols of not only medical institutions but also the social status and power gained from intellectualism. In a climate of rising institutional distrust and anti-intellectualism, this may place physicians in opposition to many patients. To function well in an uncertain future, anesthesiologists must understand not only the pharmacology of propofol or the mechanics of ventilation, but also the sociopolitical currents that shape the network in which these actants operate. This awareness does not diminish scientific rigor. It deepens it.

It is more comfortable to assume Anesthesia remains insulated from these forces. The drape shields; the monitors reassure; the pharmacology responds predictably. However, if we are not careful, then we may believe the fallacy of isolationism. We may succumb to the thinly veiled protection of intellectualism and the trappings of status and power produced by these networks. By acknowledging that Anesthesia is embedded in a dynamic network and the effect of a shifting society on these networks, we are better equipped to serve our patients who are not merely diseases, but people—whole, contextualized, and inseparable from the society that formed them.

“The good physician treats the disease; the great physician treats the patient who has the disease.”

Attributed to William Osler

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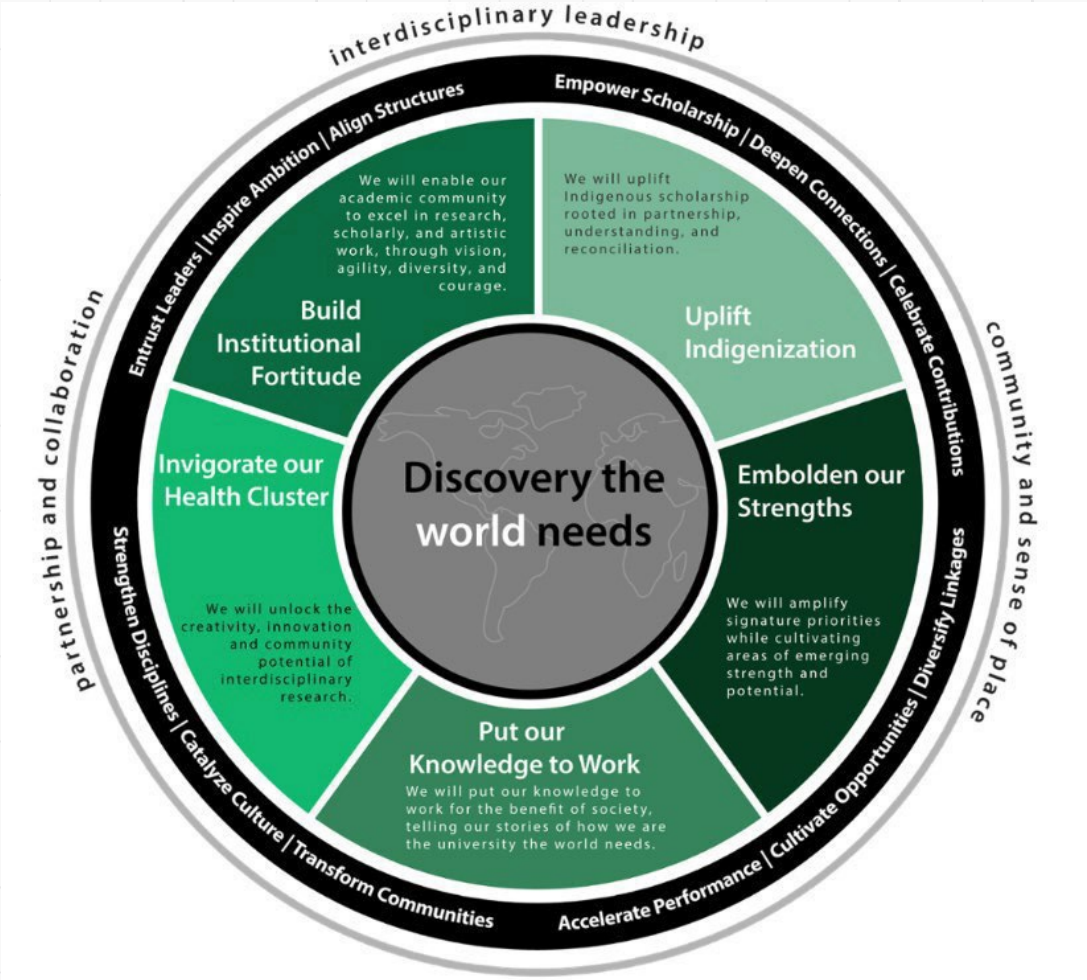

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We acknowledge we are on Treaty 6 Territory and the Homeland of the Métis. We pay our respect to the First Nations and Métis ancestors of this place and reaffirm our relationship with one another.