

October 15, 2024 | Saskatoon City Hospital



REACH **2024**

RESIDENT RESEARCH DAY

Showcase & Awards



UNIVERSITY OF SASKATCHEWAN
College of Medicine
OFFICE OF THE VICE-DEAN RESEARCH
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 **SCPOR**
Saskatchewan Centre for
Patient-Oriented Research



UNIVERSITY OF SASKATCHEWAN
College of Medicine
POSTGRADUATE MEDICAL EDUCATION
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Greetings

Dear residents and faculty members,

Welcome to the 2024 Resident Research Day offered jointly between the Postgraduate Medical Education office, the Office of the Vice Dean Research and the Saskatchewan Centre for Patient-Oriented Research at the College of Medicine, University of Saskatchewan.

Research by residents is a crucial part of residency education. It is central not only to contributing to the knowledge repertoire but also a tool for evaluating and applying practical knowledge.

As in the past, this year's resident research day highlights some of the stellar research done by our residents - which spans basic, applied, translational, and patient-oriented research.

Thank you for your contributions and best wishes for a successful Resident Research Day.



Anurag Saxena MD, M.Ed., MBA, FRCPC
Associate Dean, Postgraduate Medical Education



Dear Colleagues,

I am honoured and delighted to welcome you to REACH – the 2024 Resident Research Day. In conjunction with Postgraduate Medical Education and the Saskatchewan Centre for Patient-Oriented Research, we would like to highlight the research effort of our residents.

I want to acknowledge the exceptional dedication and work of residents and all who facilitated and contributed to medical resident research programs.

I am sure that the research of our residents will contribute to improving health outcomes in our province and beyond.



Marek Radomski MD, PhD, DSc
Vice Dean, Research



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Dr. Darrien Rattray

Keynote Address: How (and Why) to do Part-Time Research as a Full-Time Clinician

Objectives

-  Convince you that doing clinical research can be a rewarding and fun part of clinical practice
-  Provide some examples of research studies “done-off-the-side-of-desk” that have resulted in tangible clinical change
-  Discuss some tips & tricks for how to be successful in clinical research while being a full-time clinician

Biography

Originally from a small reserve in northern British Columbia, Dr. Rattray attended university and medical school at the University of Alberta and completed his Obstetrics/ Gynecology residency training at Dalhousie University in Halifax before completing a Minimally Invasive Gynecology Fellowship in Regina, where he currently practices in obstetrics and gynecology.

Dr Rattray previously served as Program Director for Obstetrics & Gynecology. He is currently an MIS Fellowship Director and will assume the role of Research Lead for Post-Graduate Medical Education at the University of Saskatchewan, College of Medicine. Additionally, Dr. Rattray serves as a member of the Academic Program Enhancement Committee.



Dr. Jamie Vander Ende, SCPOR Trainee Patient Partner Joanne Stanton Hassler

Perspectives and Experiences of Older Adults in the RUH Emergency Department

Authors: Vander Ende J, Wenzel R, Stanton Hassler J, Ellis B
Department of Emergency Medicine, University of Saskatchewan, Saskatoon, SK.

Background: There is a demographic shift in Canada, with the number of older people now out-numbering the number of children for the first time in Canadian history. As we age, we live with increasing health challenges leading to more medical complexity placing increased strain on our already struggling health care system, including the emergency department (ED). This study aims to gain insight into the perspectives and experiences of older adults using the RUH (Royal University Hospital) in an ePort to determine how such services may be enhanced.

Methods: This study utilised a mixed methods approach. A survey of older adults present in the RUH ED was conducted during their stay. Subsequently, a semi-structured phone interviews was conducted within 30 days of the initial ED visit for individuals who consented. Survey results were analysed using descriptive statistics, while interviews provided qualitative data which was analysed using Nvivo until thematic saturation was achieved.

Results: 120 surveys were collected, and 19 interviews were conducted. 56.7% of older adults in RUH ED began their care at the triage desk, and most received care primarily in the triage area, waiting room, or minor assessment waiting room; 30.2% did not receive any of their care in a bed or designated treatment space. Most were in the ED for 12-24 hours with long intervals between meals. The survey identified many challenges are areas for improvement including communication, facilities, health system, and feeling unheard.

Conclusions: Older adults appreciate and currently accept the conditions of ED care. However, they identified numerous areas that could be improved including poor communication from physicians, lack of privacy, challenges with parking, and poor accommodations for carers. These findings highlight the need for improvements in how care is delivered for older adults in the ED.



Dr. Allan Meldrum, SCPOR Trainee

Patient Partner Carol Brock

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

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

Background: Preoperative Assessment Clinics (PACs) play a vital role in the anesthetic education of patients. Pre-anesthetic educational material has been shown to increase patient satisfaction, facilitate discussion, and ease memorization burden. However, while attempts have been made to improve patient anesthetic education, knowledge retention is often poor, especially regarding understanding of the role of anesthesiologists. The purpose of this study is to investigate the effects of educational media on the anesthetic knowledge of PAC patients.

Methods: We collected survey data at the Saskatoon City Hospital PAC over 3 months. Participants were divided into 4 cohorts: one control group receiving standard verbal education only, and three groups receiving verbal education plus either written, audiovisual, or website-based education. Data was collected at three time points: pre-PAC visit, post-PAC visit, and up to two weeks post-surgery. Results were analyzed by comparing scores between time points and cohorts.

Results: Overall, 196 participants completed the pre-PAC survey, 70 the post-PAC, and 33 the post-surgery. Initial results suggest that all groups with educational material demonstrated a greater improvement in response scores on survey 2 compared to control, with the pamphlet group demonstrating the greatest average proportion of correct responses (92.6%). Post-surgery scores were comparable between all groups. The pamphlet group also demonstrated the strongest drop in anxiety levels post-PAC, but only the control and website group maintained low anxiety scores through to the post-surgery period.

Conclusions: On initial analysis, the pamphlet group was the most effective resource in educating patients on the roles and responsibilities of anesthesiologists. Educational materials in general were successful in decreasing anxiety around surgery, and there was a positive impression towards all types of educational material. Additional research should be conducted to allow remote or rural areas to participate given our study's dependence on internet-based survey completion.



Dr. Nolan Hunka

Human breast milk uniquely upregulates lipid transport proteins in the developing human intestine: Exploring bowel adaptation using an intestinal organoid model

Authors: Nolan Hunka, Farinaz Ketabat, Dean Chamberlain, Gary Groot, Amanda Hall

Background: Pediatric surgeons encounter diseases including gastroschisis and necrotizing enterocolitis that result in intestinal failure. Human breast milk (HBM) decreases the risk and severity of these diseases but limited therapeutic targets exist. The in vitro stem cell-derived human small intestinal organoid (hSIO) model facilitates investigations of the gut's natural three-dimensional microenvironment. Lipid transporters are heavily implicated in bowel adaptation as fats in HBM contribute to the majority of neonatal growth and metabolism.

Methods: Using a hSIO model, HBM, infant formula (Enfamil A+), and vehicle control (D-PBS) are introduced to media at various concentrations (1:10, 1:100, 1:1000) over 4 days. RT-qPCR, and immunocytochemistry compare intestinal transporters implicated in absorption and transport of lipids. Statistical analysis compares fold gene expression and protein concentration using $\Delta\Delta C_t$ and ANOVA.

Results: RT-qPCR reveals at highest concentration (1:10), HBM uniquely upregulates lipid transporter genes FABP1 (2.2-fold vs. 1.4-fold), SCARB2 (7.8-fold vs. 0.9-fold), and FATP4 (7.5-fold vs. 1.0-fold) compared to formula (Enfamil A+), normalized to control groups (D-PBS). Immunocytochemistry is ongoing to validate protein concentration and organoid composition changes in keeping with gene expression from RT-qPCR.

Conclusion: Human intestinal organoids are a powerful tool for scientific investigation of human disease, development, and markers of bowel adaptation. Differences in functional transporter genes expression reveals the unique effects of HBM on the human gut. These may become novel targets of therapeutic interventions to improve bowel adaptation in intestinal failure.



Dr. Charlene Salmon

Increasing Acetylsalicylic Acid Prescribing in Pregnancy Based on the New SOGC Guidelines: A Program Evaluation in Prince Albert, Saskatchewan

Authors: Charleen Salmon, Kimberly-Ann Bordun-Slater, Breanna Davis, Vijayalakshmi Udayasankar, Vivian R Ramsden, Rhonda Bryce

Background: Hypertensive disorders in pregnancy are a leading cause of maternal and neonatal morbidity and mortality. The Society of Obstetricians and Gynecologists of Canada (SOGC) released updated guidelines in May 2022 and redefined pre-pregnancy BMI >30 kg/m² as a high-risk factor (previously moderate risk), warranting prevention with acetylsalicylic acid (ASA, Aspirin.) Statistics Canada estimates that 13.6% of women of childbearing age have a BMI of 30 or more.

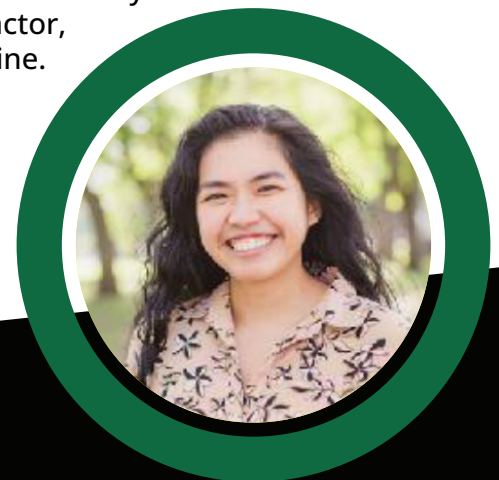
Question(s): Our aim was to develop an educational program (EP) behavioural change project, providing physician education about appropriate prescribing of ASA in pregnancy at two primary care clinics in Prince Albert, Saskatchewan. We hoped to improve the adoption of this new change in guideline.

Methods/Methodology: From January to March 2023, we evaluated the baseline frequency of ASA prescribing along with patient characteristics (age, parity, risk factors for pre-eclampsia) from the electronic medical record. We hosted a voluntary Lunch and Learn session at the two clinics to increase physician knowledge about the updated guidelines. We collected similar data from these clinics post-session. We received a Letter of Exemption from the UofS REB for application Bio 4421.

Results/Findings: One-hundred nineteen (N=119) patients were evaluated. Of these, forty-six patients (n=46) were found to be at increased risk of pre-eclampsia, twenty-nine (n=29) from the pre-session time period and seventeen (n=17) from the post-session time period. There was a substantial increase in ASA use among high-risk patients post-session, with 2 of 29 patients [6.9%] treated before and 6 of 17 [35.3%] treated after the educational lunch.

Discussion: It was noted after the session in discussion with physicians that they were not aware of changes to the SOGC guidelines regarding hypertension in pregnancy. We found there was a low level of ASA prescribing in pregnancy for the prevention of hypertension pre-session, with improvement after the lunch educational session. Many women at risk have elevated BMI as their only major risk factor, reinforcing the importance of awareness of the new guideline.

Conclusions: In general, family physicians locally were not aware of the new SOGC guidelines on ASA prescribing. We found that an educational lunch effectively improved adherence in practice.



Dr. Alison Knapp

Intensive End of Life Care: Implementation of a guideline-based order set for the withdrawal of life-sustaining therapy in the ICU

Authors: Alison Knapp, Jennifer O'Brien, Maria Cruz, Mary Ellen Walker, Joann Kawchuk, Sabira Valiani

Background: An increasing number of Canadians are facing end of life in the Intensive Care Unit (ICU).¹ Death often occurs in the ICU after a decision has been made to withdraw life sustaining therapies (WLST).^{2,3} In 2016, Downar et al. published consensus guidelines that establish standard practices for the withdrawal of life-sustaining therapy in the ICU.⁴ In this study we sought to study the feasibility and acceptability of implementing an order set, nursing flow sheet, and care plan based upon these guidelines in two Saskatoon ICUs.

Methods: This project followed a hybrid effectiveness-implementation design to assess a WLST order set, nursing flowsheet, and care plan. The assessment of the intervention included semi-structured interviews, feasibility and Quality of Death and Dying (QoDD) surveys from bedside teams, and a chart review. The Consolidated Framework for Implementation Research (CFIR) was utilized to develop the interview questions and feasibility questionnaire.⁵

Results: There was no difference in cumulative sedative dosing and time to death after extubation pre- vs. post-intervention. There was an improvement in holistic care outcomes post-implementation. The interventions materials added to the burden of paperwork of bedside healthcare providers but was felt to help them provide quality end of life care and meet the needs of patients and their families.

Conclusions: This project is an example of the implementation of the current best-practice guidelines for the provision of end-of-life care in the ICU. This study offers new insights into how such guidelines can be incorporated into the pre-existing workflow of other Canadian ICUs.



Dr. Trevor Krysak

Safety of a Catheter-Over-Needle System for Epidural Placement in a Porcine In Vivo Model

Authors: Trevor Krysak, Jonathon Gamble, Barbara Ambros, Chi Won Shin, Roma Koziy, Ban Tsui

Introduction: Continuous epidural analgesia remains an effective modality in the perioperative period and the gold standard for labour analgesia.¹ Epidural catheters are traditionally placed using a catheter-through-needle (CTN) technique. Recent studies have shown that catheter-over-needle (CON) systems have decreased complication rates (accidental catheter dislodgement and medication leakage at the catheter insertion site) and improved analgesia outcomes in peripheral nerve blocks compared with CTN techniques.^{2,3} Further study has shown the feasibility of placing epidural catheters using a novel CON system in fresh human cadavers.⁴ This proof of concept investigation aims to study the efficacy of epidural catheter placement and potential damage of the spinal cord and surrounding structures caused by using a novel CON system in a live animal model.

Methods: After local Animal Ethics Board approval, a CON epidural system (E-Cath Acc. Tsui; Tuohy 83mm, Pajunk, Geisingen, Germany) was used to evaluate the efficacy and safety of placing epidural catheters in live anesthetized pigs. Pigs were chosen as they share vertebral and spinal cord anatomy similar to humans and other nonhuman primates.⁵ The animals were anesthetized, endotracheally intubated, and positioned laterally. Three CON epidural catheter placements were attempted per animal using loss-of-resistance technique alone (Animal 1) before adding fluoroscopic guidance (Animals 2-6), given the procedural and safety concerns experienced in Animal 1. The animals were then euthanized via a pharmacologic overdose and necropsy was performed to assess final catheter location (epidural placement success) in addition to both gross anatomical and histopathological evidence of damage to the spinal cord and surrounding structures.

Results: Six pigs (10–12 weeks old, about 30 kg) were used. A Gross necropsy examination showed 17 of 18 catheters were successfully placed in the epidural space. In Animal 1 (epidural placed without fluoroscopic guidance) significant difficulty was experienced identifying the loss-of-resistance in addition to involuntary muscle contraction during placement. Number of attempts per epidural catheter placement in Animal 1 was 3, 10, and 1 respectively, with 2 of 3 catheters ultimately placed in the epidural space. Additionally, significant gross and histopathological injury was found including epidural and subdural hemorrhage, as well as hemorrhagic cavitation in the spinal cord with associated neuronal degeneration and necrosis. In all subsequent animals (procedure completed with fluoroscopic assistance) epidural placement was clinically unremarkable. There was a maximum of 2 attempts, all were successfully placed within the epidural space, and there was no evidence of gross or histopathologic spinal cord damage (Figure).

Discussion: This study showed this novel CON system for placing epidural catheters can be successful in a live animal model. The experience with Animal 1 (procedural failure, multiple attempts, and spinal cord damage) is likely related to a dermal plug in the non-stylettled epidural needle in the CON kit. Although we did not use a stylet for subsequent procedures, the use of fluoroscopy minimized attempts and distance of tissue the needle passed through, reducing the risk of plugging and subsequent damage. Our results showed a CON based epidural placement technique is possible; but further investigation is required, including using a stylet epidural needle.



Dr. Katherine (Connor) Ostoich

Do doctors know that it takes more than an apple a day? Impact of formal Nutrition Training on Family Medicine Residents' nutrition knowledge, confidence, attitudes, and counselling abilities

Authors: Katherine (Connor) Ostoich, Rejina Kamrul, Adam Clay

Background: Malnutrition and poor dietary intake are major health challenges today.^{1,2,3,4,5} There are well-established benefits of nutrition interventions, but a lack of formalized nutrition training in medical school and residency.^{3,6,7,8} There is also little published information regarding nutrition training impact on residents. Physicians lack knowledge, skills, confidence, and training to effectively counsel in daily practice.^{1,3,9,10,11,12} Consequently, there is urgent need to improve nutrition training in medicine.

Question(s): Does implementation of formal nutrition training during residency positively influence family medicine resident physicians' nutrition knowledge, attitudes, personal dietary patterns, and rates of nutrition counselling with patients?

Methods/Methodology: This pre-post study evaluated the impact of an online nutrition course provided to family medicine residents. Time was provided at Academic Half Day to complete the course as well as pre- and post-course surveys with knowledge tests through SurveyMonkey. Descriptive statistics were used to evaluate responses. The project was approved by the University of Saskatchewan Behavioural Research Board (Beh 4433).

Results/Findings: Thirteen residents completed the pre-course questionnaire (response rate = 76%). Of these, ten (77%) felt they received inadequate nutrition training and all thought patients would benefit from improved nutrition counselling. Six residents completed the post-course questionnaire (response rate = 24%). All post-course respondents thought the course was beneficial and that it should be offered to all Canadian family medicine residents, with majority believing it should be mandatory. Respondents' nutrition knowledge, confidence, beliefs on importance of nutrition counselling, and nutrition counselling in practice appear to increase/improve after training.

Discussion: Results support the literature demonstrating residents receive inadequate nutrition training and spend limited time discussing nutrition with patients.

Conclusions: Implementation of formal nutrition training during residency positively influences family medicine residents' nutrition knowledge, attitudes, and rates of nutrition counselling. It did not, however, have an impact on personal dietary patterns.

Recommendations: Future research with larger sample sizes is needed to support these conclusions and improve nutrition training during residency. Future studies should look at nutrition training in other specialties as well as examine the rate and quality of nutrition counselling after residency completion.



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