UNIVERSITY OF CALGARY

Department of Emergency Medicine
and Section of Pediatric Emergency Medicine

Research Day 2025

Featuring Keynote address by Dr. Samina Ali

"From Irrelevant to Essential: The story of Children's Pain Care"

May 8, 2025 8:00-3:30
Libin Lecture Theatre HSC | Calgary, AB

Research Day | Cumming School of Medicine | University of Calgary

A Note from the Research Director

The practice of Evidence-Based Emergency Medicine is informed by the questions generated and examined in scholarly work. The Emergency Medicine Research Group exists to improve patient and family care and health system efficiency through actionable research, collaboration, and mentorship.
On behalf of the Department of Emergency Medicine, I would like to acknowledge our residents, fellows, medical students, students, staff, faculty and collaborators across many disciplines and areas of research, whose work on their ideas throughout the year have culminated in this sharing at our Research Day, and other forums for presentation and knowledge translation. This work is especially important to the clinicians who utilize this knowledge, and patients, families and society who stand to benefit from research and innovation in Emergency Medicine. We are immensely proud of the high-quality research that is being presented today, and we congratulate every presenter and their team on their scholarly accomplishments.

I would like to thank our keynote speaker, Dr. Samina Ali, an internationally recognized leader and researcher in Pediatric Emergency Medicine research for her participation in our Research Day. I would also like to extend thanks to our Special Guest Speaker and local prodigy, Dr. Colin Bell, for his presentation today.

I would also like to thank the EMRAC team whose effort and support made this day possible: Rosette Canale, Christina Cherian, Aysha Macci, Braiden Valdarchi, Eric Gafos and our EMRAC team including Drs. Ingrid Vicas, Eddy Lang, Andrew McRae, Cody Dunne, Stephanie VandenBerg, Nik Bobrovitz, Catherine Patocka and Jessalyn Holodinsky. In addition, collaboration with our Pediatric Emergency Medicine colleagues Drs. Graham Thompson, Russell Lam, and Jennifer Thull-Freedman enriched the program you attend today. This event would not be possible without the collaboration, ideas, support and commitment to sharing from all of these wonderful people as well as the generous support of the Physician Support Fund (PSF).

Finally, I would like to thank all of the attendees today. Your interest, support and engagement is valued and provides encouragement to all of the researchers here today who strive to improve the practice of Emergency Medicine.

Dr. Kathryn Crowder
Research Director
Department of Emergency Medicine

Schedule

8:00-08:15		**Registration and Breakfast**	
8:15:8:20		**Welcome and Introductions**	**Dr. Kathryn Crowder**
ORAL PRESENTATION **Dr. Mohamed Eltorki** (moderator)	**8:20 - 8:55**	Evaluating the Impact of Canadian Triage and Acuity Scale Prioritization on Short-Term Patient Outcomes	Dr. Niloofar Taghizadeh
		Dashboard utilization for province-wide performance analysis of high-acuity pediatric care	Cora Laidlaw
		Fine-tuned Large Language Models Guided By Physician Feedback Can Improve Patient Chart Summarization For Emergency Departments	Gerry Wu (Jiajun)
		Agent-Based Simulation of Emergency Department Workflows Using Large Language Model: A Work in Progress	Alex Burn
		Pediatric Sepsis: Long-term Cognitive, Neurodevelopment & School/Work Outcomes	Sydney Guderyan
8:55-9:00		**Welcome Keynote Speaker**	
9:00-9:50		**"From Irrelevant to Essential: The story of Children's Pain care"**	**Dr. Samina Ali Keynote Speaker**
9:50-10:00		**Break**	
ORAL PRESENTATION **Dr. Andrew McRae** (moderator)	**10:00 - 10:45**	Agitation Management Strategies for Older Adults in the Emergency Department or with Emergency Medical Services: A Scoping Review	Zeeshan Chawdhry
		Managing Agitation in Emergency Medical Services for Older Adults: A *Survey* Exploration in Alberta, Canada	Fatima Shah
		Managing Agitation in Emergency Medical Services for Older Adults: A *Qualitative* Exploration in Alberta, Canada	Fatima Shah
		Screening for blunt cerebrovascular injuries in Canadian Trauma Centres: A cross-sectional study.	Dr. Dirk Chisholm
		Comparison of traditional and novel foreign body airway obstruction interventions: A simulation crossover randomized controlled trial	Dr. Julia Cirone
		Statistical and Machine Learning Methods for Forecasting Presentation to the Emergency Department: A work in progress	Sergiu Cociuba
10:45-10:55		**BREAK**	
ORAL PRESENTATION **Dr. Jennifer Thull-Freedman** (moderator)	**10:55 - 11:45**	Examining experiences of violence among healthcare workers in Calgary emergency departments	Dr. Katie Gourlay
		Descriptive Analysis of Emergency Medicine Providers' Perspectives on Recovery Coaches in Emergency Departments in Calgary, Alberta.	Cynthia Hui
		Indices of inflammation in nasopharyngeal aspirates of children presenting to the emergency department with wheeze	Dr. Graham Thompson
		Systemic and Local Immune landscape in Children presenting to the Emergency Department with suspected appendicitis (SLICED)	Dr. Graham Thompson
		Primary care access and the prevalence of medical home features	Jena Shank

		among children visiting a pediatric emergency department in Calgary, Alberta	
		Alberta emergency department wait times for substance-related presentations vs non-substance-related presentations	Dr. Allen Vorobeichik
11:45-12:25		**LUNCH**	
ORAL PRESENTATION **Dr. Jessalyn Holodinsky (moderator)**	**12:25 - 1:10**	Are Calgary Emergency Physicians Over Transfusing Patients who Present with Iron Deficiency Anemia	Nojan Mannani
		Enhancing the Sensitivity and Specificity of High-Sensitivity Troponin in Diagnosing	Madison Donoghue
		The risk of short term cardiovascular events among emergency department patients "ruled-out" using high-sensitivity cardiac troponin assays: a systematic review and meta-analysis	Dr. Niklas Bobrovitz
		ScreenPrompt: an adaptable prompting template for LLM-driven urgent and emergent evidence synthesis	Dr. Niklas Bobrovitz
		Exploring individual experiences of methamphetamine-related visits in Calgary-based emergency departments	Betalihem Lemma
		Practical guidance and best practice recommendations on clinical management of acute methamphetamine toxicity in the emergency department: a systematic review	Betalihem Lemma
1:10-1:20		**BREAK**	
ORAL PRESENTATION **Dr. Eddy Lang (moderator)**	**1:20 - 1:55**	Improving After Accreditation: Post Graduate Medical Education Policy Review and Optimization in Emergency Medicine Residency at the University of Calgary	Dr. Duncan Simmons
		ED Wait times among unhoused patients: An Interrupted Time Series Analysis	Jaden Frizzell
		Illnesses associated with increased length of stay for individuals experiencing homelessness: A retrospective cohort study of Emergency Department visits and hospitalizations.	William Rioux
		Perspectives of healthcare workers on the integration of overdose detection technologies in acute care settings	William Rioux
		Healthcare providers' experiences with police in Atlantic Canadian emergency departments- Hannah Boone	Dr. Hannah Boone
1:55-2:00		**STANDBREAK**	
ORAL PRESENTATION **Dr. Cody Dunne (moderator)**	**2:00 - 2:40**	Understanding the Impact of Rural Emergency Department Closures in Alberta	Sean Park
		Early Assessment of Vertigo patients in the Emergency Department: A Pre-Physician Physiotherapy Protocol.	Sean Sloan/Emma Richer
		Understanding and Summarizing Responsible Development for Artificial Intelligence-Based Clinical Prediction Models: A Scoping Review	Riley Martens
		Sonographic Assessment of Fasting - Emergency Room Sedations: SAF-ER SEDATIONS	Sean Park
		Self-Regulated Learning in a Post-graduate Emergency Medicine Curriculum	Dr.Tess Loch

2:40-2:45	Introduction to Special Guest Speaker	Dr. Stephanie VandenBerg
2:45-3:20	**Special Guest Speaker**	**Dr. Colin Bell**
3:20-3:30	Abstract Awards and Closing Remarks	Dr. Kathryn Crowder

Abstracts

Dr. Niloofar Taghizadeh

Institute: University of Calgary
Department: Emergency Medicine

Title: **Evaluating the Impact of Canadian Triage and Acuity Scale Prioritization on Short-Term Patient Outcomes**

Authors: Niloofar Taghizadeh, Jeffrey Bakal, Andrew D. McRae, Shawn Dowling, Brian R. Holroyd, Eddy Lang

Introduction: Evidence shows that Canadian Triage and Acuity Scale (CTAS) is a valid tool for triaging patients in the Emergency Department (ED). However, its performance varies depending on several ED, patient, and staff-level factors, with limited data-driven insights on how this can affect patient outcomes. This study is the first evaluation of the impact of CTAS levels on patient outcomes in Alberta.

Methods: We conducted a retrospective cohort study using administrative data from the 14 highest-volume adult EDs in Alberta (2017-2022). We assessed the impact of CTAS levels on short-term patients' outcome (i.e., ICU admission, and 7-day all-cause mortality) post-ED disposition, using Multi-level Logistics Regression. The multivariate models were adjusted for potential confounders such as age, gender, Deprivation Index, Charlson Comorbidity Index, disposition status, length of stay, primary diagnosis, arrival mode, hospital EDs, and visit date. We performed a Receiver Operating Characteristic (ROC) analysis to evaluate the overall ability of CTAS in predicting patient's outcome, and Hosmer-Lemeshow test for goodness of fit and
calibration of the model.

Results: Of 1,358,935 unique adult patient ED visits, 3,893 (1.4%) ICU admissions were identified. In addition, 22,692 (1.7%) deaths occurred within 7 days after leaving the EDs. The multivariate analyses showed that higher CTAS scores were significantly associated with increased odds of ICU admission and mortality; patients with CTAS 1 (Odd Ratio (OR) 95% CI: ICU=56.8 (48.6-66.5), mortality=10.9 (10.3-11.6), patients with CTAS 2 [ICU=8.1 (6.9-9.4), mortality=2.3 (2.2-2.3) compared with CTAS 3]. Patients with CTAS 4/5 had a lower risk of severe outcomes compared with CTAS 3. The ROC analysis yielded an AUC of 0.84 for ICU, and 0.76 for mortality (good to excellent discrimination ability). The model had a good calibration in analysis of both outcomes (p-value>0.05).

Conclusions: Our results showed that with a higher CTAS score (1 or 2), there was a significant increase in the risk of severe short-term outcomes, supporting the score's effectiveness in triaging ED patients. By re-assessing effectiveness of CTAS prioritization, this study helps ensure that EDs continue to use an evidence-based approach that best prioritizes patients and provides appropriate resource allocation, which is particularly important considering shifts in patient demographics, and resource utilization since the score's initial implementation.

Cora Laidlaw

Institute: University of Calgary, Medical Student
Department: Pediatric Emergency Medicine

Title: Dashboard utilization for province-wide performance analysis of high-acuity pediatric care

Authors: Cora Laidlaw, Antonia Stang, Nona Lailan, Jennifer Crotts, Jennifer Thull-Freedman

Introduction: The launch of Epic, a province-wide electronic health record (EHR), enables a new approach to performance evaluation in emergency care. Our team previously systematically created quality indicators for six high-acuity pediatric presentations including neurological, respiratory, and metabolic emergencies. The indicators were used to manually review performance in Alberta Children's Hospital (ACH) charts. This project utilizes these indicators and the new opportunity to scale data collection across all 106 Alberta hospitals. The shift from manual to automated data collection through an EHR-dashboard opens an avenue for benchmarking and evaluation of care performance.

Methods: The dashboard, created on Tableau in 2022, compiles data from clinical database systems including Epic and the National Ambulatory Care Reporting System. The dashboard was used to gather data for all Albertan pediatric emergency visits in 2023 and compare via a cross-sectional design. The top 5 measures for each condition were compared between pediatric and general hospitals with statistical evaluation (t-tests for differences in means, chi-square tests for differences in proportions). To evaluate the dashboard, data from ACH were descriptively compared to the previous manual chart review.

Results: Key data, such as medication given prior to ED, were often not available through the current dashboard due to lack of standardized reporting. This pitfall was a barrier to understanding the real-life context of some of the conditions, such as time to seizure control in status epilepticus without knowing medications administered in the prehospital setting. Despite these limitations, 9 of the indicators were available as originally defined and an additional 9 indicators were available with modification through the dashboard (18 of 21 indicators in total). The captured measures demonstrated no consistent favour to pediatric versus general sites with favourable point estimates in 5 of 17 measures ($p=0.24$). Some measures pointed to areas of enhanced care in pediatric centers. Severe asthma was more likely to have a documented severity score at a pediatric center (79% vs 72%, $p<0.01$) and there were fewer unplanned return visits for asthma presentations when discharged from a children's hospital (1.4% vs 2.5%, $p<0.01$).

Conclusion: The dashboard allows for a broader and more efficient awareness of emergent pediatric care occurring in EDs throughout the province of Alberta. Limitations do exist in automated data collection and current standardization of charting however this creates opportunities for future refinement for wider feasibility of use through data recording practices or computational linguistics.

Gerry Wu

Institute: University of Calgary
Department: Electrical and Software Engineering

Title: Fine-tuned Large Language Models Guided By Physician Feedback Can Improve Patient Chart Summarization For Emergency Departments

Authors: Jiajun Wu, Hanzhe Wei, Braden Teitge, Jessalyn Holodinsky, Kyle Exner, Steve Drew

This abstract was submitted as a Work In Progress

Introduction: ED physicians often spend significant time reading through extensive patient medical histories, leaving less time for patient care. Some elderly patients or those in critical situations may not

be able to articulate their medical histories, complicating timely decision-making. To address these challenges, we aim to investigate the ability of Large Language Models (LLMs) to summarize patients' medical charts and then evaluate their performance using the Recall-Oriented Understudy for Gisting Evaluation (ROUGE) scores. This will be compared to direct summarization scoring by emergency medicine physicians.

Methods: First, we used 3 off-the-shelf LLMs, mistral-7b-v0.3 (M1), llama-3.1-8b (M2), and gemma-2-9b (M3) to generate summaries of past medical history for 22 patients who visited the emergency department at Rockyview General Hospital between May and October 2024 to generate preliminary summaries. Two emergency physicians evaluated each summary for accuracy and omissions. Learnings from this were used to inform phase 2 in which MIMIC-IV data (contains >200,000 ED visits) was used to generate 2,006 prompt-summarization pairs, with clinical notes averaging 10,042 characters and summaries averaging 1,355 characters. This dataset was used to create a finetuned model (M4). Physicians scored the outputs of M4 for relevance and utility in clinical decision-making on a scale from -1(not useful) to 1(useful). These summarizations were also evaluated using ROUGE scores on ED charts.
Results: The finetuned M4 received the highest physician score of 0.95, compared to 0.21 for M1, 0.30 for M2, and 0.24 for M3. However, it achieved lower ROUGE scores, with ROUGE-1 at 0. 2011, ROUGE-2 at 0.0487, and ROUGE-L at 0.0957, compared to the higher scores of M3, with ROUGE-1 at 0.2347, ROUGE-2 at 0.0604, and ROUGE-L at 0.1148. The fine-tuned M4 produced summaries that better aligned with physician preferences. Here, we discovered a significant misalignment between ROUGE and physician-assigned scores. Physicians emphasized the importance of comprehensive past medical histories, and overinclusive LLM summarizations including prior chart reproduction were found to be less useful. More promising was that no false or misleading LLM summarization content was found. This highlights a critical limitation of traditional summarization metrics like ROUGE in reflecting the utility of patient chart summarization in ED settings.

Conclusions: Patient chart summarization by LLM is a promising next step in reducing administrative burden and time away from the patient's bedside. This requires concise and accurate medical history summarizations. Traditional evaluation metrics like ROUGE fail to capture this detail, emphasizing the need for human-centered chart summarization metric.

Alex Burn

Institute: University of Calgary
Department: Electrical and Software Engineering

Title: Agent-Based Simulation of Emergency Department Workflows Using Large Language Model: A Work in Progress

Authors: Zirui Wang, Alex Burn, Owen Guldberg, Macayla Konig, Jiajun Wu, Sergiu Cociuba, Braden Teitge, Jessalyn Holodinsky, Steve Drew

This abstract was submitted as a Work In Progress

Introduction: Emergency Departments (EDs) are often overwhelmed by high patient volumes, leading to long wait times and increased stress on medical staff. This can negatively affect both patient care and staff well-being. Traditional simulation methods, such as queuing theory models and discrete event simulations, often oversimplify the complexities of human interactions and team-based workflows, failing to address the collaborative dynamics critical to ED operations. Recent advancements in Large Language Models (LLMs) have demonstrated their ability to mimic human-like behaviors. LLMs can act as agents

and interact with the surrounding environment, responding to events and, more importantly, other agents, offering a nuanced approach to modeling these complexities. This advancement has created opportunities for innovative approaches to enable the next-generation simulations of ED, ultimately enhance patient care and optimize ED workflows.

Methods: Using the inherent reasoning ability of LLM agents and their capacity to simulate human interaction and behavior, we developed a simplified simulation system that included key roles within the ED (triage nurses, physicians, and patients) in replicating their daily workflows. The simulation layout was designed based on Foothill and Rockyview General Hospital's floor plans and operational setup. Additionally, patient volumes and presentations were modeled using Calgary's historical data, allowing the simulation to reflect actual patient arrival patterns and conditions. Based on consultations with ED clinicians and researchers, we designed individual LLM agents in the simulation to perform tasks such as triage, differential diagnosis, and charting. These tasks are tracked over simulated shifts to reveal key metrics in ED, including workflow efficiency, staff fatigue, and bed availability. The simulation used LLMs to mimic conversations and decision-making processes of ED personnel. Lastly, all agent conversations are recorded, and their movements are visualized in an animated representation of the ED, where the map is designed using Tiled, a flexible map-designing tool, and their movements and interactions are managed using the Phaser 3 physics engine, providing an intuitive way to observe workflows and interactions.

Results: The simulation is a work in progress. A preliminary animated layout map of the ED has been completed, providing a visual representation of staff interactions and resource usage to better understand operational dynamics. The simulation currently supports only a limited number of nurses and doctors (2-3 agents). As a prototype, the simulation can illustrate patient flow on a small scale.

Conclusions: Our simulation offers a new way to optimize ED operations by using LLMs to model real-time workflows. Our project can serve as a sandbox to evaluate new ED operations and test if they can enhance patient care and reduce staff fatigue at virtually no cost. Future plans include expanding the simulation to incorporate more agents, integrating real-world data from Calgary EDs, and testing the model performance by comparing its outcomes to actual ED workflow.

Sydney Guderyan

Institute: University of Calgary
Department: Cumming School of Medicine

Title: Pediatric Sepsis:Long-term Cognitive, Neurodevelopment & School/Work Outcomes

Authors: Sydney D. Guderyan & Graham C. Thompson

This abstract was submitted as a Work In Progress

Introduction - Sepsis in children is a serious and common presentation to Emergency Departments across the world and accounts for a significant burden of pediatric hospitalization. Studies in adults have demonstrated association between sepsis and poor long-term cognitve outcomes, but the literature exploring long-term outcomes (defined in our study as =/> 12 months) in children following episodes of sepsis is limited. Our scoping review aims to identify existing literature regarding long-term cognitive,

neurodevelopmental, academic and employment-related outcomes in the pediatric population following an episode of sepsis, and to identify any knowledge gaps in this area.

Methods - This review was conducted in accordance with the JBI methodology for scoping reviews framework. A literature search was conducted of Medline, EMBase and CINAHL and all citations were imported into Covidence. Abstract screening and full-text screening were conducted by two independent reviewers. Any disagreements were resolved by consensus. Inclusion and Exclusion criteria required that studies focus on the presentation of sepsis, concern the pediatric population (children between 29 days old and 17 years old), follow participants for 12 months or more after discharge and evaluate one or more of neurodevelopmental, cognitive, academic and/or employability outcomes. Studies that analyzed sepsis in conjunction with other critical illnesses or looked at the pediatric population in conjunction with the neonatal or adult population were included when data was individually extractable, but were excluded when data was analyzed in aggregate. Studies conducted in the NICU were excluded. Gray literature, text and opinion papers were excluded. Studies were not excluded based on participant past medical history, publication date or language. Data extraction was performed using an extraction tool designed by the reviewers.

Results - 2513 citations were retrieved and uploaded into Covidence. 333 duplicates were removed and 2 additional duplicates were subsequently identified and removed. 2178 abstracts were screened and 47 studies proceeded to full-text review. 11 studies were included and proceeded to data extraction.

Conclusions - While pediatric sepsis is a highly studied illness, there is a paucity of literature evaluating long-term cognitive, neurodevelopmental, academic and/or employability outcomes in survivors. Further research is needed to better characterize these outcomes and to investigate management strategies that may optimize outcomes.

Zeeshan Chawdhry

Institute: University of Calgary
Department: Medicine and Neurosciences

Title: Agitation Management Strategies for Older Adults in the Emergency Department or with Emergency Medical Services: A Scoping Review

Authors: Zeeshan Chawdhry, Fatima Shah, Grace Lew, Krista Reich, Kathryn Crowder, Diane Lorenzetti, Margaret McGillivray, Zahra Goodarzi

Introduction: Introduction: Agitation is commonly encountered in emergency care environments, such as the Emergency Department (ED) and with Emergency Medical Services (EMS). Agitation poses significant challenges to patient care and safety for all involved. Older adults (aged 65+ years) commonly present to ED and EMS with agitation, delirium, or dementia, for which managing agitation can be challenging for ED/EMS providers and result in adverse patient outcomes. A scoping review of literature for approaches to the management of agitation in older adults in ED and EMS environments was completed.

Methods: We searched Medline, Embase, and APA PsycINFO, combining key words and subject headings for 3 concepts: “older adults, aged 65 and older,” “agitation/dementia/delirium,” and “ED/ EMS.” Studies which explored management strategies for agitation/dementia/delirium in older adults within the ED or

EMS settings were included. Studies with younger populations (<65 years old) and/ or lacking patient data specifically from the ED or EMS environments were excluded.

Results: A total of 7113 studies were screened, of which 22 were included in this review: pharmacological (n=8), non-pharmacological (n=5), multi-component (n=3) treatments, and recommendations (n=6). Most were in the ED, and 5038 older adults were included across all studies. Antipsychotics and benzodiazepines to manage agitation were common. Nonpharmacological and multi-component interventions were less commonly evaluated and lacked exploration of patient outcomes. Recommendations stressed caution with pharmacological medications rather than prioritizing non-restraint strategies.

Conclusions: Most studies identified use of pharmacological treatment for agitation among older adults in ED/EMS settings, however, are not found to be overly effective and are associated with patient harm. There is a significant gap in evidence specific to EMS settings and evaluation of effectiveness of non-pharmacological interventions, highlighting the need for further research.

Fatima Shah

Institute: University of Calgary
Department: Medicine and Community Health Sciences

Title: Managing Agitation in Emergency Medical Services for Older Adults: A Qualitative Exploration in Alberta, Canada

Authors: Fatima Shah, Grace Lew, Ryan Lee, Krista Reich, Kathryn Crowder, Ian Blanchard, Zahra Goodarzi

Introduction: Emergency medical services (EMS) paramedics are often the first point of contact for agitated older adults, providing critical lifesaving support and transport to the emergency department. However, there is limited knowledge around agitation management and restraint use in older adults by EMS. We aim to explore the scope of paramedics' experiences with management of agitation and restraint use in older adults.

Methods: Paramedics (n=30) employed in Alberta participated in semi-structured interviews regarding their perspectives on agitation, physical/chemical restraint use for older adults in EMS, and non-restraint alternatives for agitation management. We analyzed the data using thematic analysis and deductive coding to the theoretical domains framework that links to the behaviour change wheel to identify key barriers to agitation management.

Results: Paramedics reported inadequate training and support, especially for managing agitation in older adults. The decision to use restraints is often collaborative between professionals on scene, and requires careful balance of risks, benefits, and ethical considerations. Restraints are considered a necessary safety measure but are often used as a last resort after all other agitation management strategies have failed. Communication and de-escalation strategies were commonly used, however, paramedics identified several environmental and systemic barriers (unpredictable environments, limited resources, lack of de-escalation training), as well as patient specific challenges (communication difficulties, altered mental status, comorbidities), leading to greater restraint use and burnout.

Conclusions: These findings highlight challenges faced by paramedics in the EMS system in managing agitation in older adults, emphasizing the need for improved education and training, systemic support, and resources to reduce restraint use.

Fatima Shah

Institute: University of Calgary
Department: Medicine and Community Health Sciences

Title: Managing Agitation in Emergency Medical Services for Older Adults: A Survey Exploration in Alberta, Canada

Authors: Fatima Shah, Ryan Lee, Krista Reich, Kathryn Crowder, Ian Blanchard, Zahra Goodarzi

Introduction: Emergency medical services (EMS) are often the first point of contact for agitated older adults, providing critical lifesaving support and transport to the emergency department (ED). However, there is limited knowledge available about the management of agitation and restraint use in older adults by EMS. We aimed to explore the scope of paramedic experiences when managing agitated older adults and using physical and/or chemical restraints.

Methods: Paramedics (n=162) employed in Alberta, completed a mixed methods online survey, which queried socio-demographics, role(s) in EMS, agitation and restraint use in older adults, as well as physical and moral injury.

Results: The majority of our sample consisted of advanced care paramedics (62.3%), had more than 10 years of relevant EMS experience (59.3%), and worked in ground EMS (95.7%). Paramedics reported that older adults are restrained (both chemical and/or physical) due to risk of harm to self (81.5%) or others (76.5%), combative (73.5%), or the care team is unable to provide medical assistance due to resistance (58%). Most have not experienced a situation where restraint use resulted in patient injury or adverse event (71%), and 75.9% agreed that restraints are effective in facilitating care to those presenting with agitation or aggression. Verbal reassurance (95.7%), family/familiar caregivers (79.6%), and distraction techniques such as music and redirection (65.4%) were common non-drug approaches (for managing agitation) most used by EMS. Nearly half agreed that they had the necessary training to provide alternative methods to using restraints (45.2%), 89.5% agreed that they have successfully de-escalated an agitated older adult without using restraints, and 76.6% felt capable of using non-restraint-based agitation management strategies. Nearly half of all paramedics agreed that they have suffered physical injury as a result of patient agitation (45.7%). The mean total moral injury score was 20.9 ± 6.8 (range 9-35), and a lack of satisfactory psychological wellbeing support from the employer was reported.

Conclusions: A lack of older adult specific agitation management education calls for more training within EMS to improve patient outcomes and paramedic satisfaction.

Dr. Dirk Chisholm

Institute: University of Calgary
Department: Department of Emergency Medicine

Title: Screening for blunt cerebrovascular injuries in Canadian trauma centres: A cross-sectional study

Authors: Dirk Chisholm, Austin Solak, Annie Ritter, Sean Fair, Paul Cantle

This abstract was submitted as a Work In Progress

Introduction: Blunt cerebrovascular injuries (BCVI) are injuries to the carotid and vertebral arteries secondary to blunt trauma, ranging from minor luminal irregularity to complete arterial transections. BCVI increases the risk of stroke and are often initially asymptomatic. Early identification of BCVI allows timely initiation of antithrombotic therapy, which is crucial in reducing risk of stroke. There are no universally accepted criteria for which patients should be screened for BCVI after trauma, with some emerging evidence suggesting traditional criteria lack sensitivity compared to universal screening using CT-arteriography (CT-A) as part of "panscan" evaluations. There is a paucity of understanding of the screening practices for BCVI in Canadian trauma centres. Our study objective was to describe the approach to screening for BCVI in Canadian trauma centres. Methods: We developed an electronic questionnaire, which was distributed to Level 1-3 trauma centres in Canada. Trauma medical directors or coordinators were asked to complete the questionnaire. Data were collected using REDCap software. Descriptive statistics were used to describe data.

Results: 36 centres were invited. Preliminary results include data from 24 centres, including 12 (50%) level 1, 4 (16.7%) level 2, and 7 (29.2%) level 3 trauma centres. Trauma medical directors completed the questionnaire in 17 (70.8%) centres. Only 14 (58.3%) centres reported having established protocols to select patients for screening using CT-A, with 4 centres (16.7%) utilizing universal screening of all patients undergoing CT panscan. Of centres with established criteria, 6 (42.9%) use Expanded Denver Criteria, 3 (21.4%) Denver Criteria, with 5 (35.7%) using other criteria. Criteria used were centre specific at 7 (53.8%) sites, health region specific at 4 (30.8%), and provincial trauma system specific at 1 (7.7%) site. Services responsible for identification of patients to screen included trauma surgery, 12 (85.7%), emergency medicine, 7 (50%), and radiology, 3 (21.4%). When criteria for screening were met prior to any imaging, the CT-A head and neck is performed integrated into the panscan at 9 (69.2%) sites and separately at 3 (23.1%) sites.

Conclusions: There is heterogeneity in screening practices for BCVI amongst Canadian trauma centres. Establishment of best practice guidelines based on contemporary evidence could inform evidence based care.

Dr. Julia Cirone

Institute: University of Calgary
Department: Emergency Medicine

Title: Comparison of traditional and novel foreign body airway obstruction interventions: A simulation crossover randomized controlled trial

Authors: Cirone J*, Dunne CL, Cheng A, Wilson T, Blanchard I, Holroyd-Leduc J, Sauro A, McRae A

This abstract was submitted as a Work In Progress

Introduction/Objective: Foreign body airway obstruction (FBAO), or choking, is a major cause of morbidity and mortality worldwide. Mortality due to FBAO decreases from 16% to 0% if the object is dislodged prior

to EMS arrival, so bystander response is important to save lives. Traditional FBAO interventions include abdominal thrusts and back blows. Recently, novel devices have been marketed as alternative interventions. These Airway Clearance Devices (ACDs) are hypothesized to clear the FBAO through generating suction proximal to the obstruction. There are two main designs of ACDs. LifeVac involves a face mask design attached to accordion bellows, is placed on the patient's face, then compressed and released to generate suction until the object is dislodged. DeChoker has a similar face mask design but includes a tube that is inserted into the mouth and acts as a tongue depressor and a plunger that works to dislodge the object. No clinical data exists comparing ACDs with traditional interventions. A mannequin study conducted with health care workers showed that LifeVac had increased odds of clearing FBAO within 4 minutes compared to abdominal thrusts, whereas DeChoker did not. There was no difference between abdominal thrusts and DeChoker. This simulation study aims to determine whether abdominal thrusts, DeChoker, or LifeVac result in increased FBAO clearance at 1 and 4 minutes amongst laypersons.

Methods: We are conducting an open-label, crossover, mannequin, randomized controlled trial to compare two ACDs (LifeVac© and Dechoker©) with abdominal thrusts as FBAO interventions. Adult, non-healthcare workers in Calgary are being recruited and randomized into 6 groups to determine which order they will perform the interventions in. Each participant will watch a standardized instructional video for both ACDs and abdominal thrusts, then respond to a simulated FBAO scenario three times (once for each intervention in their prescribed order). All intervention attempts will be recorded from a standardized position, and outcomes will be assessed by study hypothesis-blinded adjudicators.

Results: The outcomes will be FBAO relief within one-minute (primary) and four-minutes (secondary). A mixed effects logistic regression model will be used to estimate the odds ratio of FBAO relief (with 95% confidence intervals) using the individual as a random effect, and abdominal thrusts as the reference group. Prior to this, sequence and carryover effect will be assessed for using a similar modelling strategy.

Conclusions: This study will address the foundational question, are ACDs efficacious interventions for FBAO for laypersons? Before implementing the devices as interventions for FBAO in a clinical setting, it is important to understand how the devices work under ideal conditions. The results from this trial will help inform whether future clinical studies should be conducted.

Sergui Cociuba

Institute: University of Calgary
Department: Emergency Medicine

Title: Statistical and Machine Learning Methods for Forecasting Presentation to the Emergency Department: A work in progress

Authors: Sergiu Cociuba, Na Li, Catherine Patocka, Tyler Williamson, Jessalyn Holodinsky

This abstract was submitted as a Work In Progress

Introduction: Introduction: Emergency departments (ED) in Canada face challenges with overcrowding leading to increased wait times, patient dissatisfaction, lower quality of care, and poor patient outcomes. To investigate ED overcrowding, this project aims to forecast the number of patients coming to the ED by

considering temporal trends, patient level clinical factors, individual social determinants of health, and environmental factors using statistical and machine learning forecasting models.

Methods: Data will be analyzed from Sept 1, 2022- Aug 31, 2025, across Alberta from administrative and public data sources. The National Ambulatory Care Reporting System contains data on ED visits (date and time of presentation, arrival by ambulance, presenting complaint, primary diagnosis, triage score, demographics, etc.). Environmental factors (weather, mass gatherings, and holidays) will be obtained from Canadian Urban Environmental Health Research Consortium, Environmental and Climate Change Canada, and provincial websites. Social determinants of health (household income, immigration status, housing status, and education) will be obtained from Statistics Canada. Multiple statistical models will be applied to forecasting ED arrival, including autoregressive integrated moving average (ARIMA), seasonal ARIMA (SARIMA), and error, trend, seasonal (ETS) exponential smoothing time series algorithms. Machine learning models (e.g. random forests and gradient boosting machines) will also be used to predict input. We will use both fixed and rolling window methods for training and forecasting. For model validation, we will apply rolling-origin cross-validation to assess the generalizability and performance of the models across different time periods. Forecasting windows of 1 and 7 days in the future will be used. Model performance will be assessed using root mean squared error and mean squared error. Variable importance will be explored through model coefficients and feature analysis.

Results: Data analysis is ongoing. This project will forecast ED arrival 1 and 7 days in advance, enabling healthcare administrators to better prepare and allocate resources. It will also identify the most critical features for forecasting ED arrival, assisting policymakers in creating targeted interventions. Lastly, the project will provide valuable insights for future research by comparing the performance metrics of various modeling approaches.

Conclusions: This project will support the development of predictive tools for resource management and operational planning in the ED. Ultimately, this project aims to improve patient care, optimize ED performance, and guide policy makers to address overcrowding challenges.

Dr. Katie Gourlay

Institute: University of Calgary
Department: Emergency Medicine

Title: Examining experiences of violence among healthcare workers in Calgary emergency departments

Authors: Singh, P., Gourlay, K., Holodinsky, J., Crowder, K., Greidanus, M

This abstract was submitted as a Work In Progress

Introduction: Violence in Canadian emergency departments (ED) is common and places staff and patients at risk. ED healthcare workers (HCW) face a higher risk of workplace violence, contributing to burnout rates and increasing healthcare costs. The 2020 CAEP Position Statement on ED Violence calls for the development of national standards for preventing and investigating violence. Despite this, ED violence continues to be underreported and, consequently, not addressed by authorities. This study aims to 1) describe the perceptions, experiences and impact of violence on ED staff in Calgary, AB, 2) identify the

facilitators and barriers to reporting violence in emergency departments among HCW, and 3) identify solutions for improving workplace safety and violence reporting.

Methods: An anonymous survey was delivered to nurses, physicians, and other HCW's across four Calgary EDs using Qualtrics. Participants were recruited through online and poster advertisements within EDs, emails, and word of mouth. The survey consisted of multiple choice and ranking questions, with purposeful prompt options for open-ended, narrative responses. Data was analyzed with counts, percentages and medians.

Results: As of Nov 13th, 236 healthcare workers participated in the survey (140 nurses, 62 physicians, six paramedics, six protective services, eight healthcare aids, one research assistant, one unit clerk, one transporter and one technologist) . A majority of participants (71%) reported an increase in violence in ED in the last five years. Verbal abuse (98%) and name calling (92%) were reported as the most common forms of violence. 87% of participants reported physical violence, with 74% reporting one or more physical assaults in the past year. 24% of respondents reported injury due to workplace assault with 15% missing work due to injury. The most common barriers to reporting violent incidents included: (1) no action being taken after incidents, (2) inconvenience of reporting, and (3) perceived normalization of violence in EDs. Enforcing clear policies and increased security presence were ranked highest as safety priorities.

4Conclusions: This study shows that verbal and physical violence in EDs is common and perceived to be increasing. There are many barriers to reporting violence that underscore the need for administrative intervention. These results highlight the importance of implementing policy changes geared toward preventing violence in Canadian EDs.

Cynthia Hui

Institute: University of Calgary
Department: Cumming School of Medicine

Title: Descriptive Analysis of Emergency Medicine Providers' Perspectives on Recovery Coaches in Emergency Departments in Calgary, Alberta.

Authors: Cynthia Hui, Braiden Valdarchi, Christina Cherian, Kathryn Crowder, S. Monty Ghosh, Stephanie VandenBerg

This abstract was submitted as a Work In Progress

Introduction: INTRODUCTION: Individuals with substance use disorders (SUD), including those related to alcohol, nicotine, and drugs, utilize emergency departments (EDs) more frequently than the general population (Lennox et al., 2021; O'Neill et al., 2024). This patient group often face significant social and structural barriers to healthcare access, leading to higher rates of patient-initiated discharges, distrust in healthcare providers, and negative healthcare experiences (Health Canada, 2024; Lennox et al., 2021; O'Neill et al., 2024). These challenges delay care and increase morbidity and mortality related to SUD (Earheart & Crisanti, 2019; Health Canada, 2024; Lennox et al., 2021; O'Neill et al., 2024; Santos et al., 2023). Research in Canada and the United States indicates that a peer support model of care can lead to better healthcare outcomes for patients living with SUD through strengthening social support, providing

emotional assistance during crises, and easing navigation through the healthcare system (Earheart & Crisanti, 2019; Health Canada, 2024; Lennox et al., 2021; O'Neill et al., 2024; Santos et al., 2023)

METHODS: From 2025 to 2028, four adult EDs in Calgary will implement a Recovery Coach Network (RCN). Recovery coaches, who have lived experience of substance use and recovery, will support patients aged 18 and older with substance-related concerns during their ED visits and help facilitate smoother transitions to community care (Earheart & Crisanti, 2019; Lennox et al., 2021; O'Neill et al., 2024). In early 2025, an online survey will be distributed to emergency medicine providers – including physicians, nurses, social workers, security officers, paramedics, and other allied health professionals – to assess their initial perceptions and acceptance of the RCN in Calgary's adult EDs. A convenience sampling method will be used to gather responses, with an expected total of 275 participants completing the survey. After collecting the survey data, a descriptive analysis will be conducted to identify key themes related to healthcare providers' initial perceptions and acceptance of the RCN.

RESULTS: Given the limited utilization of RCNs in Canada, with Ontario being the only province currently employing RCNs in its EDs, the survey findings are expected to reflect limited familiarity with recovery coaches among healthcare providers (Ontario Health, 2023).

CONCLUSION: Insights from the baseline survey will inform later evaluations of the RCN integration and its impact on healthcare access and outcomes. By reducing barriers and strengthening transitions to community care, RCNs have the potential to improve trust, continuity of care, and outcomes for individuals with SUD, ultimately decreasing morbidity and mortality associated with SUD.

Dr. Graham Thompson

Institute: University of Calgary
Department: Pediatrics and Emergency Medicine

Title: Indices of inflammation in nasopharyngeal aspirates of children presenting to the emergency department with wheeze

Authors: Graham Thompson, Byron Berenger, Sydney Guderyan, Simone Horwitz, Craig Jenne, Margaret Kelly, Beata Mickiewicz, Christina Thornton, Shahina Wiehler

This abstract was submitted as a Work In Progress

Introduction: Respiratory distress is a common pediatric presentation to the emergency department (ED), often associated with lower airway illnesses such as bronchiolitis, viral-induced wheeze, pneumonia and asthma. Airway inflammation in these conditions is mediated through alterations in local cytokines/chemokines including interleukins, chemokine ligands and interferons, and results in recruitment of inflammatory cells (neutrophils, eosinophils). In this translational study we evaluate the inflammatory landscape of nasopharyngeal aspirates (NPA) in acutely wheezing children, determining the variations in protein mediators, cellular abundance and activation profiles across differing etiologies of lower airway disease.

METHODS: Children aged 0 through 17 years presenting to the Alberta Children's Hospital ED with wheeze and undergoing a clinically-indicated NPA are eligible. Those with a history suggestive of foreign body, current wheeze >7 days or conditions suggestive of immunosuppression are excluded. NPAs are analyzed

by respiratory pathogen panel, microscopy, multiplex cytokine/chemokine proximity extension assay (OLINK Target 96)), and microbiome. Caregivers complete a survey in the ED detailing the clinical presentation and risk factors for respiratory illness (daycare attendance, household smokers, prematurity, atopy etc). Health records are reviewed for health services utilization, clinical laboratory investigations and diagnosis. A REDCap follow-up survey is distributed to caregivers on days 7, 28, 90 and 365 to obtain data on duration and severity of symptoms, recurrences and medication use. Descriptive and multivariable analyses will be used to describe cell types and relationships between inflammatory, microbiologic and clinical data.

RESULTS: We have enrolled thirteen children to date, with a target of 50 total participants. Current challenges include matching the availability of research team members with timing of clinically-indicated NPA collection and the number of clinically-indicated NPAs performed vs nasopharyngeal swabs. Recent strategies to improve enrolment include adding research nurses to the team to increase sample capture in the ED.

CONCLUSIONS: Our study maps the relationship between the inflammatory milieu in acutely wheezing children and subsequent outcomes and health services utilization. A deeper understanding of the inflammatory landscape has the potential to identify biomarkers integral in optimizing diagnostic and prognostic decision making in the ED.

Dr. Graham Thompson

Institute: University of Calgary
Department: Pediatrics and Emergency Medicine

Title: Systemic and Local Immune landscape in Children presenting to the Emergency Department with suspected appendicitis (SLICED)

Authors: Graham Thompson, Mary Brindle, Nils Forkert, Shaunna Huston, Craig Jenne, Margaret Kelly, Karen Kopciuk, Matthew Lau, Kathy McCoy, Braedon McDonald, Beata Mickiewicz, Hans Vogel

This abstract was submitted as a Work In Progress

Introduction: Clinical manifestations of appendicitis in children, including fever, abdominal pain, vomiting and tachycardia, suggest a systemic inflammatory response to local disease. In this study, we perform innovative discovery analyses to determine the lineage, functional activation and spatial orientation of inflammatory cells present in pediatric appendix tissue and evaluate the relationship of these local cells to the systemic inflammatory landscape in blood.

METHODS: Children aged 5 through 17 years presenting to the Alberta Children's Hospital emergency department (ED) with suspected appendicitis were eligible. Research samples were collected at the time of initial clinical blood draw. Single-cell mass cytometry was performed on whole blood (cytometry time of flight- CyTOF Helios). Systemic inflammatory proteomics was performed on serum (multiplex proximity extension assay - OLINK Target 96). For those children who underwent appendectomy, formalin-fixed paraffin-embedded tissue arrays were created for single-cell cytometry (multiplexed ion beam imaging - MIBI). Participants were categorized into 2 cohorts: those with pathology proven acute appendicitis (AA), and those with non-appendicitis abdominal pain (NAAP). Our analyses include heat maps, contingency

tables and ordinal regression models. Supervised modelling includes partial least squares, neighborhood analyses and spatial modelling. Pathway analysis techniques will determine potential relationships between tissue and blood cellular profiles and systemic inflammatory mediators.

RESULTS: Sixty children were included, 30 with AA and 30 with NAAP. 28 (46.7%) were female; the mean age was 11.2 years (±2.5). Initial data demonstrate significant differences in systemic CD4+ T-cell, CD8+ T-cell, NK cell and B-cell abundance in those with AA vs NAAP, while differential extracellular marker expression varied significantly between the neutrophil clusters. MIBI and OLINK analyses are pending.

CONCLUSIONS: This study explores the local and systemic inflammatory response in children presenting to the ED with suspected appendicitis. Our preliminary results show exciting differences in systemic cell lines and extracellular marker expressions. These results further illustrate the complex immune response during appendicitis and may be useful in the development of future diagnostic tools for children presenting to the ED with abdominal pain.

Jena Shank

Institute: University of Calgary
Department: Department of Pediatrics

Title: Primary care access and the prevalence of medical home features among children visiting a pediatric emergency department in Calgary, Alberta

Authors: William Macdougall, Jena Shank*, Melanie Bechard, Jianling Xie, Ximena Mancipe, Jennifer Thull-Freedman

Introduction: Canadian emergency departments (EDs) are facing a crisis of overcrowding with record-setting waiting times. Simultaneously, physician shortages and other health system challenges have left 1 in 5 Canadians without a primary care provider (PCP). The Medical Home Model sets an international standard for quality in primary care. Little is known about medical home prevalence for children in Calgary. The objective of this project is to inform quality improvement initiatives, we will determine the prevalence of features of a medical home among children visiting the ED of our urban tertiary children's hospital. We will also determine factors associated with lack of accessible primary care and reasons for presentation to the ED.

Methods: We conducted a cross-sectional survey of caregivers of patients aged < 18 years visiting our ED. Participants were recruited consecutively over seven 24-hour periods in September, 2023. Patients were excluded if unstable, if residing out of province, or if they have a sibling already enrolled. Interpretation was offered. The primary outcome measure was developed from the U.S. Census Bureau's National Survey of Children's Health, and was adapted to local context. Outcomes were analyzed descriptively and with Chi square analysis for comparison of proportions. The medical home composite measure consisted of 5 subcomponents: having a usual doctor, a usual source of care, family centred care, receiving needed referrals and care coordination. Each domain required a positive response to be deemed to have a medical home. Logistic regression of medical home prevalence was performed using age, sex, race and language spoken at home as variables. Geospatial analysis to further understand determinants of having medical home are in progress. The project was exempted from research ethics review due to the primary purpose of quality improvement.

Results: Of 1477 patient visits during the enrollment week, 1290 were eligible. 64% were approached, and 80% of participants provided sufficient data for primary outcome analysis. While 85% of respondents stated their child had a usual doctor, only 38% had a usual doctor and met the definition of having a medical home. The majority (58%) of participants who reported having a usual doctor found it either somewhat or very difficult to get an appointment for an acute concern. Race identified as non-white or mixed had a lower adjusted odds ratio for having a medical home (0.54, p=0.0055) compared to participants that listed white only as their race as the reference standard.

Conclusions: Many children who visit the ACH ED have difficulty accessing primary care when they are sick, and a significant proportion have primary care that does not meet the definition of a medical home. Primary care accessibility must be addressed in the Calgary Zone to improve the quality and timeliness of our local ambulatory healthcare system.

Dr. Allen Vorobeichik

Institute: University of Calgary
Department: Emergency Medicine

Title: Alberta emergency department wait times for substance-related presentations vs non-substance-related presentations

Authors: Allen Vorobeichik, Megan Harmon, Jaden Frizzell, Niloofar Teghizadeh, Jessalyn Holodinsky

This abstract was submitted as a Work In Progress

Introduction: Emergency department (ED) wait times impact patients' health outcomes and satisfaction. Wait times are influenced by a number of factors including, but not limited to, provider bias based on preferred presenting complaints. Though triage protocols exist to stratify patient acuity and optimize wait times, there is not currently a standardized process for ED physicians in Alberta to determine which specific patients to see next, potentially giving way for bias. This may be especially true for the ~2% of Albertan ED visits presenting with substance-related complaints who are often perceived negatively by providers and are at risk of misdiagnosis and inappropriate treatment. This study aims to explore and describe one metric of ED care (wait time) to better understand if discrepancies exist for patients with substance use disorders.

Methods: This study is a retrospective, observational cohort study comparing time to physician initial assessment (PIA) of all adult patients presenting to any of Albertas 98 EDs with Substance Misuse complaints, as defined by the Canadian Emergency Department Information System (CEDIS) codes (#751-753). These patients will be compared to those presenting with all other CEDIS complaints. The study period extends from the launch of Connect Care at each site up to September 2024. To ensure comparability, this is a match cohort study in which patients will be matched based on five key criteria: age, sex, Canadian Triage Acuity Scale (CTAS) score, time of day, and ED geography type (urban vs rural). Statistical analysis will be conducted using Poisson regression to evaluate differences in time to PIA between the two groups. Models will be stratified by AHS Zone to account for regional differences in patient presentation and department operations. Results: Data analysis is ongoing. Results from the Poisson regression will be reported, including rate ratios (RR) and 95% confidence intervals (CI), to quantify differences in time to PIA between patients with Substance Misuse complaints and those with other complaints.

Conclusion: Conclusions drawn in this study do not aim to evaluate provider bias but rather to establish a foundation on which future research can explore this topic.

Nojan Mannani

Institute: University of Calgary
Department: Cumming School of Medicine

Title: Are Calgary Emergency Physicians Over Transfusing Patients who Present with Iron Deficiency Anemia
Authors: Nojan Mannani, Melanie Sohn, Kathryn Crowder, Stephanie VandenBerg
This abstract was submitted as a Work In Progress

Introduction: Iron deficiency anemia (IDA) is the leading global cause of anemia, frequently resulting from blood loss, decreased iron absorption, or increased iron requirements. Symptoms of IDA range from weakness, fatigue, and light-headedness to more severe complications like dyspnea, angina, and syncope. Emergency physicians (EPs) may transfuse patients who present with IDA with red blood cells (RBCs). While this temporarily elevates hemoglobin levels, it does not address the underlying cause of anemia and carries significant risks to patients. This study aims to assess whether Calgary EPs are over-transfusing patients who present with IDA using the Alberta Medical Association Toward Optimized Practice (AMA TOP) Clinical Practice Guidelines as a framework, and evaluate if iron infusions/supplementation may be a more appropriate treatment in certain situations.

Methods: A retrospective chart review will gather data from adult patients who presented to four Calgary emergency departments (EDs) over the past two years discharged with a diagnosis of “anemia” or similar ICD 10 code. Data collection will include patient age, Canadian Triage and Acuity Scale (CTAS) score, triage vitals, hemoglobin (Hgb), mean corpuscular volume (MCV), orders for packed RBCs, orders for oral or IV iron, ED length of stay, ED revisits, and oral iron prescriptions. Presence of IDA, appropriateness of RBC transfusion, and whether a patient could/should have received iron supplementation will be determined by the AMA TOP Guidelines for IDA.

Results: Both global and Canadian studies have found that EPs may over-transfuse patients presenting with IDA. We are currently waiting on data to investigate if this trend is present in Calgary EDs.

Conclusions: If EPs are over transfusing patients with IDA, this could be a topic for a quality improvement project and continuing medical education to help identify patients that may benefit from oral/IV iron in addition to or instead of RBC transfusion. This has the potential to both reduce healthcare costs through better allocating healthcare resources and produce better health outcomes for patients.

Madison Donoghue

Institute: University of Calgary
Department: Cumming School of Medicine

Title: Enhancing the Sensitivity and Specificity of High-Sensitivity Troponin in Diagnosing Acute Coronary Syndromes Among Chronic Kidney Disease Patients in the Emergency Department: A Scoping Review
Authors: Madison Donoghue, Morgan Donoghue, Linda Yang, Andrew McRae

Introduction: In the emergency department, triaging and accurate initial diagnosis is crucial for timely care. Chronic kidney disease (CKD) complicates initial cardiac workup interpretation and risk calculation, making diagnosing acute coronary syndromes (ACS), such as NSTEMI and STEMI more difficult. The objective of this scoping review is to systematically identify and describe strategies used to improve the diagnostic accuracy of high-sensitivity troponin testing for ACS in patients with CKD.

Methods: Articles were included based on setting, participant demographics, intervention recieved and outcome measured. Patients must be seen in emergency departments (ED) with chief complaint of chest pain or ischemic symptoms. Patients must be adults with CKD stages 1-5. Included patients on dialysis or with end stage renal failure. Ineligible if presenting with acute kidney injury or hs-Tn was not measured in the ED. They must have received single or serial testing with hs-TnI or hs-TnT within the ED. The primary and secondary outcomes of our study were optimal hs-Tn cut-off for various stages of CKD with sensitivity and specificity reported. Commenting on strategy used to obtain optimal hs-Tn cut-off for accurate detection of ACS. Secondarily, evaluating negative and positive predictive values for each strategy.

Results: Data extraction was organized using Covidence online software. A total of 777 papers were identified from the Cochrane, MEDLINE, and EMBASE databases. Of these, 717 were excluded based on titles and abstracts, 45 were removed after full-text review, and 15 studies were included in the final analysis. Two primary approaches emerged: serial sampling with adjusted cutoff values and multivariable modeling. Optimal cut-off ranges from 99th percentile (16ng/L female or 34ng/L male) to as high as 1150 ng/L with specificities still averaging <90%. Multivariable models used a wide variety of variables to adjust for patient factors but did not substantially improve accuracy of MI diagnosis

Conclusion: Diagnosing acute coronary syndrome (ACS) is particularly challenging in individuals with varying degrees of chronic kidney disease (CKD). Given the significant impact of external variables, future research should focus on developing clinical decision-making tools to enable more tailored, patient-specific care.

Dr. Niklas Bobrovitz

Institute: University of Calgary
Department: Emergency Medicine

Title: The risk of short term cardiovascular events among emergency department patients "ruled-out" using high-sensitivity cardiac troponin assays: a systematic review and meta-analysis

Authors: Niklas Bobrovitz, Cody Dunne, Taylor Krawec, Jinan Daqqa, Anabel Selemon, Tyara Marchand, Christian Cao, Caitlin McClurg, Jessalyn Holodinsky, Paul Ronksley, Andrew McRae

This abstract was submitted as a Work In Progress

Introduction: Introduction: There is uncertainty regarding the need for universal noninvasive testing for patients with chest pain who are identified as low risk of myocardial infarction ("ruled-out") and discharged from the emergency department. If the incidence of short-term major adverse cardiac events (MACE) is lower than the incidence of harm from additional testing, then these patients may not require urgent follow-up. To inform policy discussions on the balance of risks we conducted a systematic review to synthesize estimates of the incidence of MACE within 30 days of an emergency department encounter

for symptoms of acute coronary syndrome (ACS) in which myocardial infarction was ruled out using electrocardiography (ECG) and a high-sensitivity cardiac troponin assay.

Methods: We searched for observational cohorts, quasi-randomized, and randomized studies in MEDLINE (Ovid), Embase (Ovid), Web of Science (Core Collection), ClinicalTrials.gov, the Cochrane Central Register of Controlled Trials (Ovid), and Europe PubMed Central (limited to preprints) from Jan 1, 2009 to May 1, 2024. We included studies of adult patients (18 years or older) presenting with symptoms suggestive of ACS in whom myocardial infarction had been ruled out using an ECG and high-sensitivity troponin diagnostic algorithm. We excluded patients with chronic kidney disease (eGFR < 60 ml/min). The primary outcome was the cumulative incidence of MACE (i.e., myocardial infarction, revascularization, and death) within 30 days of emergency department discharge. Estimates were pooled using random-effects meta-analysis.

Results: We included 96 studies after screening 7683 abstracts and 930 full text articles. We've completed preliminary analysis on 28 of the included studies, which reported 30-day MACE incidence data for 70,039 patients. Estimates of the incidence of 30-day MACE ranged from 0%-3.8%. The pooled cumulative incidence of 30-day MACE was 0.30% (95% CI 0.20-0.50%, I2=96%, n=28). The pooled cumulative incidence of individual 30-day MACE events were as follows: myocardial infarction 0.30% (95%CI 0.10-0.50%, I2=75%, n=8); revascularization 0.70% (95% CI 0.30-1.20%, I2=95%, n=7); death 0.10% (95% CI 0-0.10%, I2=25%, n=15).

Conclusions: The preliminary results of this systematic review show a low cumulative incidence of 30-day MACE for patients in whom myocardial infarction has been "ruled out" in the emergency department using ECG and high-sensitivity cardiac troponin assays.

Dr. Niklas Bobrovitz

Institute: University of Calgary
Department: Emergency Medicine

Title: ScreenPrompt: an adaptable prompting template for LLM-driven urgent and emergent evidence synthesis

Authors: Christian Cao, Jason Sang, Rohit Arora, David Chen, Robbie Kloosterman, Matt Cecere, Jaswanth Gorla, Richard Saleh, Ian Drennan, Bijan Teja, Michael Fehlings, Paul Ronksley, Alexander Leung, Dany Weisz, Harriet Ware, Mairead Whelan, David Emerson, Rahul Arora, *Niklas Bobrovitz*

Introduction: During public health emergencies or health system crises, healthcare professionals and policy-makers are required to make quick evidence-based decisions. Systematic reviews (SRs) and evidence syntheses, while essential for providing reliable guidance, are labor-intensive. Article screening is a particularly tedious process that may delay the dissemination of critical findings. Using Large Language Models (LLMs) for screening may expedite this process. This study aimed to develop and test generalizable prompt templates for LLM-driven abstract and full-text screening that could be applied to diverse systematic reviews, including reviews focused on urgent and emergent issues in public health and the health system.

Methods: We evaluated the performance of GPT-4 (GPT4-0125-preview) in screening 48,425 abstracts and 12,690 full-text articles from 10 systematic reviews. Three of the reviews were focused on interventions for health emergencies. LLMs were prompted to include or exclude articles based on established eligibility criteria for the reviews. The outputs from the LLM were compared to the decisions made by human reviewers to assess diagnostic test accuracy, sensitivity, and specificity.

Results: The LLM demonstrated high performance, achieving a mean sensitivity of 97.6% (range: 86.7–100%) and specificity of 85.6% (range: 68.3–95.9%) for abstract screening. For full-text screening, the model attained a mean sensitivity of 97.3% (range: 89.7–100.0%) and specificity of 92.7% (range: 80.7–100%). The LLM demonstrated strong performance for the three reviews on interventions for urgent and emergent issues in public health and the health system: (1) a review on interventions to reduce emergency hospital admissions, 97.1% sensitivity and 85.3% specificity for abstract screening, 100.0% sensitivity and 94.4% specificity for full text screening; (2) a review on the protective effectiveness of prior infection and vaccines against death and hospitalization from COVID-19; 97.8% sensitivity and 68.3% specificity for abstract screening, 89.7% sensitivity and 80.7% specificity for full text screening; (3) a review on SARS-CoV-2 seroprevalence; 96.7% sensitivity and 91.7% specificity for abstract screening, 97.0% sensitivity and 96.3% specificity for full text screening. In terms of efficiency, the LLM completed screening of 10,000 abstracts in less than 24 hours at a cost of $157.02 USD, compared to the traditional manual process, which required over 83 hours and $1,666.67 USD.

Conclusions: LLMs can significantly enhance the speed and accuracy of systematic review screening. This has particular relevance in times of urgent or emergent issues in public health or the health system during which timely access to synthesized evidence may be critical for clinical decisions and policy making. Our findings suggest that this LLM template could be used in a pre-screen stage to eliminate irrelevant articles or as a second reviewer paired with a single human reviewer. The next step of this research will focus on automating data extraction.

Betalihem Lemma

Institute: University of Calgary
Department: Community Health Services

Title: Exploring individual experiences of methamphetamine-related visits in Calgary-based emergency departments

Authors: Caitlin Stokvis, Sumantra Ghosh, Betalihem Lemma*, Dylan Viste & Stephanie VandenBerg

Introduction: Introduction: With a growing number of methamphetamine-related emergency department (ED) visits, it is critical to better understand the hospital experience from the patient's perspective. Little is known about the clinical experience of people who use methamphetamines and seek care in the ED, and few studies have examined the reality of receiving care from the patient's perspective.

Methods: This research project uses a qualitative design and semi-structured interviews with individuals who had accessed a Calgary Zone ED for a methamphetamine-related concern. Interviews were completed, transcribed, and reviewed using an inductive thematic analysis where the team grouped notable statements and discussed themes. People with lived experiences of illicit methamphetamine use were consulted to ensure accurate theme interpretation.

Results: A total of six participants were identified, and five interviews were analyzed. Participants expressed concerns regarding stigma, negative attitudes, and limited discussions beyond their immediate medical needs and offered suggestions to improve the healthcare experiences of individuals who use methamphetamines. Three emergent themes were: 1) experiences of stigma; 2) going beyond medical needs; and 3) patient preferences for healthcare delivery.

Conclusions: This study describes the experiences of individuals who sought emergency care for methamphetamine-related concerns. A limitation of this study is the number of interviews analyzed, as recruiting participants with lived experiences was challenging, particularly given the trauma and previous negative interactions with the healthcare system that can lead to distrust. However, the findings remain valuable, as they address critical gaps in understanding the patient experiences of receiving emergency care for methamphetamine toxicity. These insights can help better identify healthcare service gaps and provide interventions that are defined by and reflective of the end-user experience.

Betalihem Lemma

Institute: University of Calgary
Department: Community Health Services

Title: Practical guidance and best practice recommendations on clinical management of acute methamphetamine toxicity in the emergency department: a systematic review

Authors: Caitlin Stokvis, Sumantra Ghosh, Betalihem Lemma*, Dylan Viste & Stephanie VandenBerg

Introduction: Increasing use of illicit methamphetamines is a significant public health concern across North America. Methamphetamine-related emergency department (ED) visits are on the rise, especially those associated with violence and agitation secondary to methamphetamine toxicity. We aimed to provide recommendations to address the current lack of evidence-based approaches to methamphetamine toxicity in the ED and guide frontline health workers, patients, researchers, caregivers, and policymakers in managing acute methamphetamine toxicity.

Methods: A systematic review was conducted on the effectiveness of pharmacological and nonpharmacological treatment approaches to manage acute methamphetamine toxicity in patients presenting violently in the ED. It identified observational and cohort studies, randomized controlled trials, and case-control/reports. Ovid Medline, Embase, Cochrane Library, and other databases were searched from January 2011 to July 2023. Outcomes of interest included length of stay in the ED, admission frequency, mortality, provider satisfaction with the intervention, and patient and staff safety perceptions. A panel of experts helped develop recommendations following the GRADE Evidence to Decision Framework and evaluate the quality of evidence.

Results: We identified 20 studies from 10,333 articles, enrolling 20,757 participants and reporting on 20 pharmacological treatments (antipsychotics and/or benzodiazepines) as monotherapy or combined. For evidence-based recommendations, 10 clinical questions were selected. The strength of evidence for most outcomes ranged from low to very low.

Conclusions: This systematic review is the first to evaluate the management of acute methamphetamine toxicity in a rigorous, systematic manner. The evidence-based practical recommendations developed by clinical experts will help guide the equitable care of people experiencing the adverse effects of illicit methamphetamine. The recommendations offer strategies for pharmacological and nonpharmacological therapeutic approaches, prevention and harm reduction, and approaches to avoid while managing patients with acute methamphetamine toxicity in the ED

Dr. Duncan Simmons

Institute: University of Calgary
Department: Improving After Accreditation: Post Graduate Medical Education Policy Review and Optimization in Emergency Medicine Residency at the University of Calgary

Title: Improving After Accreditation: Post Graduate Medical Education Policy Review and Optimization in Emergency Medicine Residency at the University of Calgary

Authors: Duncan Simmons, Anjali Pandya and Catherine Patocka

This abstract was submitted as a Work In Progress

Introduction: In 2022, our Emergency Medicine (EM) residency program's accreditation identified the absence of program-specific policies and a review mechanism (requirement 2.1.1) as an Area for Improvement (AFI). This quality improvement initiative aimed to review current Postgraduate medical education (PGME) policies and develop a feasible resident-focused strategy to address the AFI.

Methods: We conducted a root cause analysis that involved defining the problem, assembling a team, identifying root causes through policy review, PGME clarification, and resident focus groups (mapped with an Ishikawa diagram), analyzing findings, and developing and implementing solutions.

Results: A senior resident from the program reviewed all PGME policies and determined that the current policies are generally robust and apply well to our context except for the one on fatigue risk management (FRM). Discussions with PGME, including consultation with University legal counsel, clarified that we are advised against creating program-specific policies. Instead, in cases where it is unclear how existing PGME policies apply to our program, we should focus on developing operating standards. Our resident-led focus group identified key barriers to FRM including: 1) The nature of the work of emergency medicine, including uncertainty when shifts will end, and frequent interruption to one's circadian rhythm; 2) Off-service rotations (often stacked in a row) where learners lack familiarity with how to advocate for themselves and their wellness; and 3) Competing personal obligations outside of work, resulting in intentional scheduling of shifts in a manner that is not conducive to FRM.

Conclusions: Our results suggest that program-specific policies are not required due to robust existing policies and PGME and rules prohibiting program-specific policy creation. Instead, we have focused on developing program-specific operating standards and establishing a regular review mechanism. Barriers to FRM during EM residency were also identified and several actions are planned for program leadership to mitigate these issues.

Jaden Frizzell

Institute: University of Calgary
Department: Department of Community Health Sciences

Title: ED Wait times among unhoused patients: An Interrupted Time Series Analysis

Authors: Jaden Frizzell, Megan Harmon, Niloofar Taghizadeh, Stephanie VandenBerg, Jessalyn Holodinsky

Introduction: The Emergency Department (ED) is often the first line of care for the unhoused population. The unhoused population often faces societal bias due to stigma surrounding housing status which can result in differential access to medical care, potentially impacting wait times in the ED. ED wait times are an increasing area of concern following the COVID-19 Pandemic. This project aimed to understand if ED wait times in Alberta differ between housed and unhoused populations, and if the COVID-19 pandemic impacted this.

Methods: Using the National Ambulatory Care Reporting System, we accessed data from all adult visits to an ED or Urgent Care Clinic in Alberta from April 1st, 2018, to September 30th, 2023. Unhoused patients were identified using ICD-10 code Z59.0. Standard descriptive statistics were used to characterize the cohort. Interrupted time series analysis was used to characterize wait time trends and the relationship between housing status and wait times pre-, during-, and post-COVID-19 pandemic. Separate analyses were performed for each Canadian Triage Acuity Score (CTAS). Analyses were conducted using R version 4.4.2. Results: 9,157,281 visits were included in the analysis. Among these 134,992 (1.47%) were made by unhoused individuals. Mean patient age varied by housing status (unhoused: 40.07 years CI [40.00, 41.14]; housed: 48.80 years CI [48.78, 48.81]). Sex distribution also varied by housing status (unhoused: 29.21% female; housed: 53.12% female). Over the course of the study, overall mean wait time increased from 82.06 to 122.33 minutes. Pre-pandemic (April 2018 to March 2020) wait times for unhoused individuals were significantly longer than for housed individuals across all CTAS levels apart from CTAS 1. The magnitude of difference ranged from 1.3x longer (CTAS 2) to 2.3x longer (CTAS 5). While all wait times were seen to temporarily decrease at pandemic onset (March 2020) longer wait times were still seen for unhoused patients at all CTAS levels. After the pandemic (May 2020 to September 2023) wait times were significantly longer for unhoused patients across all levels of CTAS – including CTAS 1 (1.8x longer). The magnitude of difference remained similar to the pre-pandemic period for CTAS 2-4 at CTAS 5 the difference in wait times grew to 3.3x longer.

Conclusions: Across Alberta, ED wait times were longer for unhoused patients. The magnitude of difference grew as patient acuity decreased. Future work will continue to explore reasons for this, such as time of presentation and specific reasons for presentation. This study's results can inform future interventions that act to improve access to care for the unhoused population, reducing ED wait times and better supporting unhoused patients.

William Rioux

Institute: University of Calgary
Department: Medicine

Title: Illnesses associated with increased length of stay for individuals experiencing homelessness: A retrospective cohort study of Emergency Department visits and hospitalizations

Authors: S. Monty Ghosh,, Khokan C. Sikdar , Adetola Koleade, Jordan Ross, William Rioux*, Eddy S. Lang, Geoff Messier, Robert Tanguay,Stephen E. Congly, Karen L. Tang

Introduction: Introduction: Individuals experiencing homelessness (IEH) tend to have increased length of stay (LOS) in acute care settings, which negatively impacts health care costs and resource utilization. It is unclear however, what specific factors account for this increased LOS. This study attempts to define which diagnoses most impact LOS for IEH and if there are differences based on their demographics.

Methods: A retrospective cohort study was conducted looking at ICD-10 diagnosis codes and LOS for patients identified as IEH seen in Emergency Departments (ED) and also for those admitted to hospital. Data were stratified based on diagnosis, gender and age. Statistical analysis was conducted to determine which ICD-10 diagnoses were significantly associated with increased ED and inpatient LOS for IEH compared to housed individuals.

Results: Homelessness was associated with increased LOS regardless of gender or age group. The absolute mean difference of LOS between IEH and housed individuals was 1.62 hours [95% CI 1.49 – 1.75] in the ED and 3.02 days [95% CI 2.42-3.62] for inpatients. Males age 18-24 years spent on average 7.12 more days in hospital, and females aged 25-34 spent 7.32 more days in hospital compared to their housed counterparts. Thirty-one diagnoses were associated with increased LOS in EDs for IEH compared to their housed counterparts; maternity concerns and coronary artery disease were associated with significantly increased inpatient LOS.

Conclusion: Homelessness significantly increases the LOS of individuals within both ED and inpatient settings. We have identified numerous diagnoses that are associated with increased LOS in IE; these inform the prioritization and development of targeted interventions to improve the health of IEH.

William Rioux

Institute: University of Calgary
Department: Medicine

Title: Perspectives of healthcare workers on the integration of overdose detection technologies in acute care settings

Authors: William Rioux, Kyle Kilby, Stephanie Jones, Pamela Joshi, Stephanie Vandenberg & S. Monty Ghosh

Introduction: People who use drugs (PWUD) face disproportionately high rates of hospitalizations and patient-initiated discharge (leaving against medical advice), explained by a combination of stigma, withdrawal, judgment, blame, and improper pain management. In addition, evidence has shown that despite abstinence-based policies within healthcare settings, PWUD continue to use their substances in healthcare environments often hidden away from hospital staff, resulting in fatalities. Various novel overdose detection technologies (ODTs) have been developed with early adoption in a few settings to

reduce the morbidity and mortality from risky substance use patterns within healthcare environments. Our study aimed to gain the perspectives of healthcare workers across Canada on implementing ODTs within these settings.

Method: We used purposive and snowball sampling to recruit 16 healthcare professionals to participate in semi-structured interviews completed by two evaluators. Interview transcripts were analyzed using thematic analysis to identify key themes and subthemes.

Results: Participants recognized ODTs as a potentially feasible solution for increasing the safety of PWUD in healthcare settings. Our results suggest the mixed ability of these services to decrease stigma and build rapport with PWUD. Participants further highlighted barriers to implementing these services, including pre-established policies, legal recourse, and coordination of emergency responses to suspected overdoses. Lastly, participants highlight that ODTs should only be one part of a multifaceted approach to reducing harm in healthcare settings and could currently be integrated into discharge planning.

Conclusion: Healthcare professionals from across Canada found ODTs to be an acceptable intervention, but only as part of a larger suite of harm reduction interventions to reduce the harms associated with illicit drug use in healthcare settings. In contrast, participants noted institutional policies, stigma on behalf of healthcare workers and leadership would present significant challenges to their uptake and dissemination.

Dr. Hannah Boone

Institute: University of Calgary
Department: Faculty of Medicine, CCFP-EM Program

Title: Healthcare providers' experiences with police in Atlantic Canadian emergency departments

Authors: Hannah Boone, Gillian Sheppard, Stephen Czarnuch, Maisam Najafizada, Ryan Slaney

This abstract was submitted as a Work In Progress

Introduction: The emergency department (ED) is a primary place for patients affiliated with the criminal justice system to access medical care. Patients that are criminal suspects, victims of crime and inmates requiring medical care are typically accompanied by police members, making the ED a place where law enforcement and healthcare providers frequently converge. Interactions between law enforcement officers and healthcare providers in the ED are complicated by the need to balance the health interests of individuals with criminal justice interests, and are further complicated by a risk of violence. Emergency medicine (EM) physicians' interactions with police can be disruptive during medical evaluation and treatment, particularly for trauma patients. Police presence in the ED can compromise patient privacy and confidentiality and deter the public from seeking care in the ED. However, police presence in the ED can alleviate the risk of violence from patients that threaten harm to themselves or others. The main source of conflict between healthcare providers and law enforcement in the ED is the uncertainty surrounding hospital policy and legal requirements, as well as ambiguity regarding police interests and access. Currently, there is little Canadian research on this topic. As demonstrated by multiple recent Canadian Association of Emergency Physicians (CAEP) grand rounds, the intersection of the criminal justice system and the ED is a priority topic for EM healthcare providers. In order to understand the impacts of police

presence on patient-care in the ED, we first need to understand the relationship between ED healthcare providers and law enforcement within Atlantic Canadian healthcare institutions.

Methods: This study includes three phases. In this first phase of the project, collected pilot data will help inform Phase 2 and Phase 3 of this larger body of work. Phase 1 uses qualitative methodology based in grounded theory to conduct focus groups with ED physicians and allied ED health professionals to explore their experiences with police presence in the ED. In Phase 2, the analysis of the focus group data will be used to develop a survey to deliver to ED providers about police presence in the ED. Phase 3 will be knowledge translation to ED providers and postgraduate students locally, regionally within the Atlantic Canadian region, and nationally at CAEP grand rounds and other platforms.

In Phase 1, we will conduct focus groups with ED health professionals including staff emergency physicians, nurses, paramedics and postgraduate resident physicians, to explore their experiences with police presence. We will use purposeful sampling, targeting specific participants who can provide the most relevant information and reverse snowball sampling, gaining new participants through referral from initial participants, to recruit participants from each of the four Atlantic provinces (Newfoundland and Labrador, New Brunswick, Nova Scotia and Prince Edward Island). The Atlantic Emergency Research Organization (AERO) network has direct access to approximately 200 healthcare providers within each of the four Atlantic provinces. Potential participants will be contacted via email using contact information obtained from the AERO network. We estimate a sample size of 30 providers, divided into five focus groups with a maximum of six participants each. By interviewing allied health professionals from each Atlantic province, experiences can be explored in-depth with the resources available, without over-collecting data.

Focus groups will be guided by the semi-structured focus group guide, while allowing for natural conversations to proceed. Focus groups will be analyzed using grounded theory, followed by applying three steps to analyze the data: 1) Open-coding, where raw data are analyzed and categories are extracted; 2) Axial coding, to identify connections between categories; and 3) Selective coding, to organize the most frequent and predictive categories in order to identify and define a core framework. Methods:

Results: Data collection for Phase 1 will begin in February 2025.

Conclusion: This study will describe EM physicians and allied ED health professionals past experience with police in the ED in the Atlantic Canadian provinces. The results will identify knowledge gaps concerning policy and legal rights. Our study's outcomes can inform curriculum development and teaching practices, thus enhancing medical education and ultimately leading to improved patient care in complex ED situations.

Sean Park

Institute: University of Calgary
Department: Emergency Medicine

Title: Understanding the Impact of Rural Emergency Department Closures in Alberta

Authors: Sean Park, Esther H. Yang, Delaney Duchek, Grace Perez, Jeff Bakal, and Aaron Johnston

This abstract was submitted as a Work In Progress

Introduction: Rural Emergency Departments (EDs) serve as the first contact for time sensitive medical conditions, handling stabilization and transfer to urban centers for management. In Alberta, where ~ 22% of the population resides in rural areas, media reports estimate that rural EDs faced over 38,000 cumulative closure hours in 2023—equivalent to 4.3 years. Despite this, there is a notable lack of standardized reporting or investigation into the impact of these closures. Our study focuses on Milk River, a rural community in Alberta, as a representative case study to illustrate methodology to examine the effects of intermittent closures on presentation patterns and ED utilization of local residents.

Methods: Rural EDs were screened for closure using publicly available AHS archival data from 2019 onwards. A total of 8 additional rural EDs from each of the AHS zones not experiencing closures were identified and used to generate baseline descriptive statistics. From the NACRS database, annual ED visits from all individuals with postal codes within select communities were reviewed and organized by presentation to their local or alternative ED. Dates of closures of the Milk River ED were identified, and data was summarized using means and standard deviation with chi-square analysis to determine significance.

Results: In rural communities not experiencing service interruptions from 2019 - 2023, 14-16% of annual ED visits of local residents occurred outside their local ED. In Milk River, 10% of ED visits of local residents occurred at an alternative ED in 2019. From 2021- 2023, Milk River had 7 intermittent ED closures, with at least 62 affected days (mean=10.3, SD=10.1). While total annual ED visits by Milk River residents, either to local or alternative ED, remained relatively constant over time at 1246 visits (SD=59), Milk River residents' visits to alternative EDs steadily increased to 12%, 23%, 31%, and 40%, from 2020-2023, respectively, which were statistically different ($p<0.05$) compared to the EDs without interruptions per year.

Conclusion: Intermittent closures of the Milk River ED resulted in a significant change in how residents accessed care. The total number of annual presentations to any ED remained relatively constant, while the proportion of visits occurring outside their local ED increased. This data suggests that intermittent rural ED closures influence residents to seek EM care in alternative locations, rather than presenting to local alternative non-emergent options.

Emma Richer/ Sean Sloan

Institute: Alberta Health Services
Department: Allied Health, South Health Campus

Title: Early Assessment of Vertigo patients in the Emergency Department: A Pre-Physician Physiotherapy Protocol.

Authors: Sean Sloan, Scott Maddison, Emma Richer, Cristaine Yamabayashi, Robert Thom, Nathan Doerksen

This abstract was submitted as a Work In Progress

Introduction: Physiotherapy service in the South Health Campus (SHC) Emergency Department (ED) was established in 2017 with an initial focus on early assessment of admitted patients and assessment of patients in ED at risk of admission. The ability for physiotherapy to assess and treat patients beyond cases of admission avoidance provides an opportunity to improve ED flow in a currently strained system. Our team looked to conditions that often present to ED that might otherwise attend a private physiotherapy

clinic for primary care. Approximately 100 Vertigo cases present to and are discharged home from SHC ED monthly.

Methods: In August of 2024 the median length of stay in ED for ambulatory emergency outpatients presenting with a chief complaint of vertigo was 509min, arrival to first physician contact time was 334min. Our Pilot project developed a protocol to screen vertigo patients and, when appropriate, assess and treat them, providing a handover to physicians.

We recognized that optimal impact for a vertigo PT intervention in the ED was to see patients prior to first physician contact. We collaborated with ED physician leads and PT vestibular therapy subject matter experts from SHC and the Red Deer General hospital. We developed a screening tool to identify patients appropriate for assessment and red flags that would trigger our team to defer assessment. Our protocol focused on finding patients who presented with Canadian Triage and Acuity Scale(CTAS) 3 or higher with a presenting complaint of vertigo and a history suggestive of peripheral or Benign Paroxysmal Positional Vertigo (BPPV). These patients would be provided intervention and community follow up education as part of our intervention. Patients identified with more complex conditions including vestibular Neuritis or signs of central cause vertigo were be flagged for further medical assessment.

Results: Our Pilot project ran from November 1- December 13, 2024. We screened 16 patients presenting with a chief complaint of Vertigo and CTAS of 3 or greater. During the pilot run 70 patients presented to ED that would have been eligible for pilot inclusion; median ED length of stay was 526 min.

Our screening tool identified 5 patients as not appropriate to assess prior to physician. 4 of those 5 patients were ultimately diagnosed with a medical issue outside of the scope of PT. The 11 patients seen by PT prior to the physician were all discharged home from ED, with a median LOS of 427min. None of the 11 cases assessed in the pilot had a 7 day return to ED related to vertigo. Cases identified as having BPPV and provided PT intervention (n=5) had median LOS of 264min. 5 patients seen by PT returned satisfaction surveys asking them to rate their comfort with returning home from ED before they saw PT Versus after then saw PT. On average patients reported a 32% higher comfort level with returning home from ED after the PT assessment and treatment.

Conclusions: Physiotherapy provision of early, pre-physician screening of vertigo patients in the emergency department presents a safe and potentially significant tool that allied health can offer to improve patient care and flow in ED. Physiotherapists with additional training in vestibular therapy have the skills to effectively screen patients for red flags and when appropriate complete comprehensive vestibular assessment and treatment in ED prior to physician assessment. Our allied health and emergency department teams are now working to optimally integrate this new tool into the allied health SHC ED department service model to provide the best balance of patient care, patient flow and equitable patient prioritization.

Riley Martens

Institute: University of Calgary
Department: Community Health Sciences

Title: Understanding and Summarising Responsible Development for Artificial Intelligence-Based Clinical Prediction Models: A Scoping Review

Authors: Riley Martens, Jessalyn Holodisnky, Jessica Simon, & Zack Marshall

This abstract was submitted as a Work In Progress

Introduction: Introduction: Artificial intelligence (AI) has allowed the improvement of clinical prediction models and other tools used in emergency medicine settings. Clinical prediction models are dichotomized based on function, prognosis and diagnosis. New clinical prediction models use machine learning techniques and patient data to provide outputs relevant to health care decisions. A risk of the AI-based clinical prediction models and decision supports are erroneous outputs from biased training data or poor design. The outputs have the potential to impact the delivery of care by exacerbating pre-existing inequity and introducing new barriers. Responsible development offers a way of reducing and preventing the negative impacts and unintended use of these tools. There is a need to understand how responsible development has been reported in the literature based on pre-specified criteria and how it has been conceptualized. The focus will be on mortality prediction as it informs clinical decisions and selection of appropriate care pathways

Methods: We will conduct a scoping review following the Arksey and O'Malley framework as extended by Levac et al., with adherence to the PRISMA-ScR guidelines and checklist. This scoping review will examine the reported literature regarding AI-based clinical predictions models used in acute care that predict mortality as an output for adult patients. The literature will be retrieved by querying several academic databases including Medline, EMBASE, Scopus, Compendex, ACM and IEEE Xplore. The search strategy will be developed through consultation with health sciences and engineering librarians. An inclusion/exclusion criterion will be applied to identify relevant literature through two rounds of screening, title-abstract and full-text review with at least two reviewers determining eligibility.

Results: The pre-specified criteria for responsible development being examined in the literature is informed by the Responsible Research and Innovation (RRI) toolkit. The four components of the RRI approach are responsibility, interest holder engagement, transdisciplinarity, and impact assessment. Responsibility will explore the incorporation of computational and clinical ethics, in addition to any frameworks or guidelines employed. Transdisciplinarity will be assessed based on team composition, clinician consultation, and context. Interest holder engagement will be the identification of patient-oriented research strategies, inclusion of patients and families as research partners, and the consideration of multidisciplinary care teams such as physicians, nursing, and allied health. Impact assessment will critically review any reported outcome of these tools including socio-technical considerations, bias mitigation, and meta-perspectives.

Conclusions: While this study is in progress, we anticipate that the results and conclusions will be relevant to any future development and implementation of AI-based clinical prediction models which predict mortality. Special emphasis will be toward the ethical creation and use of these tools by highlighting a responsible development approach. Findings will be especially relevant to emergency medicine and intensive care, allowing clinicians from

these settings to understand the ethical gaps and strengths of the models employed. Ideally, fostering the ability to identify issues and improvements in the tools they use.

Sean Park

Institute: University of Calgary
Department: Emergency Medicine

Title: Sonographic Assessment of Fasting - Emergency Room Sedations: SAF-ER SEDATIONS

Authors: Sean Park*, Lindsey Berthelsen, Colin Bell

This abstract was submitted as a Work In Progress

Introduction: Emergency medicine (EM) and anesthesia literature often disagree on the importance of fasting status for procedural sedation. EM guidelines state there is insufficient evidence to delay sedation based on fasting status, relying on data from pediatric populations for support. The incidence of aspiration events during emergency department (ED) procedural sedation remains rare, but the discordance between guidelines and local protocols creates uncertainty and fasting status continues to influence the timing of less emergent sedations.

POCUS has been used to assess gastric contents since the 1980s. Most patients who met fasting guidelines remained high-risk when assessed using POCUS, though many patients included in these studies were from pediatric populations. The correlation between fasting status and objective assessment with POCUS in adult patients remains unclear. We hypothesize that adult ED patients will have high-risk gastric contents even while meeting anesthesia fasting guidelines.

Methods: Participants presenting to the Foothills Medical Centre ED who may have required ED sedation completed a questionnaire on fasting status based on sedation guidelines. POCUS images were obtained using the PERLAS method in supine and right lateral decubitus positions. Images were anonymized and stored offline for analysis. Images were classified as high risk (solid content) or lower risk (empty or liquid). Interrater reliability was calculated using Fleiss' Kappa Method. The chi-square test with Yates correction was used to assess the association between fasting status and gastric content. Ethics approval was provided by the University of Calgary: (REB24-0749)

Results: 59 subjects were recruited. Interrater reliability with a kappa value of 0.93 was almost perfect. 44 patients did not meet fasting recommendations, of which 68.2% had high-risk gastric contents while 31.2% had low-risk content. 15 patients met fasting guidelines with low-risk content in 66.7% and 33.3%, respectively. No significant association was observed between fasting status and gastric contents assessed by POCUS ($\chi^2(1, N = 59) = 0.0447$, $p = 0.8325$).

Conclusion: Our data suggests excellent interrater reliability in interpreting POCUS images of gastric contents and no significant association between fasting status and POCUS assessment of gastric contents in adults.

Dr. Tess Loch

Institute: University of Calgary
Department: Emergency medicine

Title: Self Regulated Learning in a Post-graduate Emergency Medicine Curriculum

Authors: Loch, T & Patocka, C

This abstract was submitted as a Work In Progress

Introduction: Emergency medicine (EM) residents are responsible for learning a large breadth of material, including high acuity presentations. As such, a strong academic curriculum is essential for learners to succeed clinically. Our Canadian EM residency program, including Fellows of the Royal College of Physicians of Canada (FRCPC) and CCFP-EM (Certification in the College of Family Physicians of Canada) streams, recently changed the delivery of certain core EM topics from didactic to self-regulated learning (SRL) based on residents' desire for more self-directed content. SRL is a process in which the student sets goals, develops learning strategies and self-monitors their progress. The goal-setting phase of SRL includes self-efficacy, which is the learner's belief that they are able to perform a certain task. We sought to evaluate learner self-efficacy throughout one SRL session on a core EM topic. All residents were given reading materials and protected study time to review it. Based on resident feedback, the FRCPC group also had small groups to discuss the content, but the CCFP-EM group did not.

Methods: A 10-point Likert scale rating self-efficacy was provided after the residents received the SRL material, post dedicated study time (and prior to a small group discussion for the FRCPC program only), and following a non-evaluative oral exam on the content. After the survey was complete, we conducted semi-structured interviews with six residents from various years and used realist theory to construct context-mechanism-outcome statements of what worked, and what didn't, with the new curriculum.

Results: Overall, self-efficacy did improve throughout the SRL process. However, based on the semi-structured interviews, learners implied that the scales were somewhat arbitrary as they were not focused on reflecting on this concept. Learners appeared to need a "catalyst" to enter the SRL cycle. For example, the small groups for the FRCPC stream were seen as a motivator to review the material.

Conclusion: In order for SRL to be successful, learners must have some degree of orientation to the SRL cycle, as well as some external drivers to ensure prioritization and engagement with the material.

Evaluation Survey

Please take time to complete the Research Day Evaluation Survey:

https://survey.ucalgary.ca/jfe/form/SV_bjFyGjrNOcRNVT8

Notes