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ABSTRACTS

CAEP/ACMU 2023 Scientific Abstracts

May 28th – May 31st, 2023

Contents

Introductory message

Research in emergency medicine (EM) guides improvements in emergency patient care. Research helps to identify and standardize the best care to optimize patient outcomes.

Fostering a rich research environment requires funding, education, and a rigorous peer-review process. The CAEP Research Committee is pleased to support the development of EM-related research skills across Canada by administering two annual programs: the CAEP Grant Competition and the CAEP Abstract Competition.

Abstracts are the core of the research competition. This year for CAEP 2023 which will be held in Toronto, we had 3 submission categories: research, education, and quality improvement and patient safety, as well as subcategories for quantitative research, qualitative research and education innovations. We received 264 abstract submissions from EM researchers from across Canada and internationally, where the top-ranked abstracts will be presented at the research plenary session. In addition, the best resident, pediatric, new investigator, education innovation, venous thromboembolism (VTE), quality improvement and patient safety, and medical student abstracts submitted by CAEP members are awarded financially to subsidize conference registration.

CAEP has extended its partnership with CIHR to continue to offer the CIHR-ICRH/CAEP Mid-Career Lecturer Award in Emergency Medicine; where the recipient will deliver a plenary presentation at the annual CAEP conference. The purpose of establishing this annual award by the CIHR-ICRH and CAEP is to recognize an individual's outstanding contribution to the advancement of emergency medicine in Canada and internationally at the mid-point of their career.

The hours of work that our volunteer reviewers contribute is critical to the success of the Research Committee activities during the busy abstract and grant competitions. Each submission is thoroughly read, reviewed, and scored by at least three experienced reviewers. The Research Committee would like to thank the reviewers for their contribution and recognize their commitment to support EM research.

The Research Committee would like to acknowledge the substantial effort of CAEP staff, particularly Shanna Sariyildiz and Jennifer Gale, in coordinating the grant and abstract competitions, and in preparing the CAEP conference research program and *CJEM* research supplement.

Disclaimer: The large number of submitted abstracts and the deadlines associated with publication do not permit the author communication, abstract revisions, or *CJEM* editorial review. The abstracts are presented, as they were submitted to the Research Committee. Only the author affiliation supplied by the presenting author is specified.

Note: The CAEP 2023 final program contains the scheduled times for the abstract presentations.

Kerstin de Wit, MBChB, MD, MSc
CAEP/ACMU Research Committee Chair

Alix Carter, MD MPH
CAEP/ACMU Research Committee Abstract Competition Lead

CAEP/ACMU 2023 Abstract Awards

First place, Plenary Presentation, Grant Innes Research Paper and Presentation Award

Ben Forestell

PL01 Supraglottic airway versus tracheal intubation for initial airway management in out-of-hospital cardiac arrest – a systematic review and meta-analysis of randomized controlled trials

Second place, Plenary Presentation

Matthieu Robitaille

PL02 The Canadian Transient Ischemic Attack Score as a Predictor of Ischemic Lesion on Magnetic Resonance Imaging in Transient Ischemic Attack or Minor Stroke Following a Negative Computed Tomography Scan

Third place, Plenary Presentation

Luc de Montigny

PL03 The predictive performance of scripted call-taking triage assessed using a large emergency medical services dataset linked to outcomes

Fourth place, Plenary Presentation

Kerstin de Wit

PL04 A longitudinal study on Canadian emergency physician burnout levels during the pandemic

Top Medical Student Abstract Award

George Cao

LO60 Cost analysis and economic evaluation of a virtual pediatric emergency department pilot program

Top Resident Research Abstract Award

Hashim Kareemi

LO31 Development and validation of a machine learning model for predicting early subsequent stroke in emergency department patients with transient ischemic attack

Top New Investigator Abstract Award

Pierre-Gilles Blanchard

LO29 Diagnostic yield of head computed tomography in elderly patients presenting to the emergency department with delirium

Top QIPS Abstract Award

Renee Bailey

LO54 An emergency department quality improvement intervention for decreasing time to pain medication in sickle cell disease

Top Pediatric Research Abstract Award

Catherine Varner

LO15 Maternal emergency department use before pregnancy and infant emergency department use after birth

Top Education Innovation Abstract Finalists

Melissa Lorenzo

LO47 Deliberate practice makes perfect: differentiating abusive versus accidental burn and bruise injuries in children

Tommy Han

LO48 Undergraduate medical education point-of-care ultrasound curriculum development

Robert Carey

LO49 A Single Day Disaster Medicine Curriculum for an Emergency Medicine Residency Program

CAEP-CanVECTOR Research Abstract Awards

Matthew Yeung and Poshika Dhingra

PO002 Tranexamic Acid in Emergency Medicine. An Overview of Reviews

Yifan Kang

PO061 Emergency physician deviation from pulmonary embolism diagnostic protocol

Choosing Wisely Canada Abstract Awards

Christian Vaillancourt

LO36 Economic evaluation of a strategy empowering paramedics to assess low-risk trauma patients using the Canadian c-spine rule and selectively transport patients without immobilization

Kerstin de Wit

MP36 Derivation of a clinical decision rule to guide head CT use in older adults who have fallen

CAEP Resident Research Abstract Awards

Kyle Eastwood

LO09 A survey of needs and expectations for artificial intelligence according to Canadian emergency physicians

Samara Adler

LO26 How well do ED physicians comply with the CAEP Acute Atrial Fibrillation Checklist for stroke prevention and disposition?

Kevin Guo

LO34 Evaluating the impact of a specialized and centralized online medical consultation system for paramedics

Kiran Grant

LO61 Creating an inventory of Emergency Virtual Care Initiatives in Canada: National CAEP Survey

Jessica Kent-Rice

LO66 Barriers and facilitators to the implementation of point of care testing for HIV in the emergency department: A mixed-methods study.

Jamie Riggs

MP11 Best practices for the care of the ventilated patient in the emergency department: a scoping review

Jeffrey Elder

MP45 Epidemiology and outcomes for level 1 and 2 traumas during the first wave of COVID19 in a Canadian centre

CIHR-ICRH/CAEP Mid-Career Lecturer Award in Emergency Medicine

Steven Brooks

Plenary Presentation Removing Luck from the Chain of Survival for Cardiac Arrest

CAEP/ACMU 2022 Grant Awards

EMAF Grants

Keerat Grewal

Cancer care for patients diagnosed with cancer through the emergency department

Catherine Varner

Emergency department utilization before 20 weeks of pregnancy and risk of severe maternal and neonatal morbidity

CAEP-SREMI Grants

Kaitlin Endres

Home field advantage? – Comparing the quality of EPA observations completed on- versus off-service

Sean Wong

Factors impacting repeat emergency department visits in patients diagnosed with Cannabinoid Hyperemesis Syndrome—a qualitative description of patient perspectives.

Quality Improvement and Patient Safety Grants

Jennifer Thull-Freedman

Improving Appropriateness and Patient-Centredness of Care in Febrile Infants: A Quality Improvement Collaborative

Lianne McLean

Development and evaluation of a reusable orthopaedic assistive devices recycling (ROAR) Program

Junior Investigator Grants

Cody Dunne

Evaluation of foreign body airway obstruction interventions: A retrospective cohort analysis

Kayla Furlong

How geriatric-friendly are emergency departments in Newfoundland and Labrador? A survey- and interview-based project

Joanna MacLean

Tele-guided IV education study for shock trauma air rescue service

Emily Lostchuck

Pelvic Inflammatory Disease in the Emergency Department

Abbreviations

PL = Plenary; LO = Lightning oral; MP = Moderated poster; P= Poster

Plenary

PL01

Supraglottic airway versus tracheal intubation for initial airway management in out-of-hospital cardiac arrest – a systematic review and meta-analysis of randomized controlled trials

B. Forestell, S. Ramsden, S. Sharif, MD DRCPSC, J. Centofanti, K. Al Lawati, BHSc, MD, S. Fernando, M. Welsford, Dr. Michelle Welsford, J. Nolan, B. Rochwerg

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Introduction: For adult patients with out of hospital cardiac arrest (OHCA), initial advanced airway management strategies include placement of a supraglottic airway (SGA) or tracheal intubation. However, despite several randomized controlled trials (RCTs), there is uncertainty regarding the optimal approach for airway management in these patients. We conducted a systematic review and meta-analysis comparing the use of a SGA with tracheal intubation for initial airway management in OHCA.
Methods: We performed a systematic search for RCTs including adult OHCA patients (> 18 years of age) who were randomized to either SGA or tracheal intubation for initial airway management. We searched MEDLINE, PubMed, EMBASE, Cochrane Library, and unpublished sources from inception to July 29th, 2022. Reviewers screened abstracts, full texts, and extracted data independently and in duplicate. We pooled data using a random-effects model, and assessed risk of bias of included studies using the modified Cochrane tool. We assessed certainty of evidence using the Grading Recommendations Assessment, Development and Evaluation (GRADE) approach and communicated results using the GRADE informative statements framework. We pre-registered the protocol on PROSPERO (CRD42022342935).
Results: We included 4 RCTs (n = 13,412 patients). First pass success for tracheal intubation varied amongst included trials (51–77%). The use of a SGA results in return of spontaneous circulation (ROSC) more often than tracheal intubation (relative risk [RR] 1.09; 95% confidence interval [CI] 1.03–1.15; high certainty) and a faster time to advanced airway placement (mean difference 2.5 minutes less; 95% CI 1.6–3.4 min less; high certainty), although there may be no effect on aspiration events (RR 1.03; 95% CI 0.95–1.13; low certainty). Compared with tracheal intubation, the use of a SGA may increase survival at longest follow-up (RR 1.12; 95% CI 0.91–1.38; low certainty), although there was an uncertain effect on survival with good functional outcome (RR 1.14; 95% CI 0.83–1.58; very low certainty).
Conclusion: In adult patients with OHCA, compared with tracheal intubation, the use of a SGA for initial airway management leads to higher ROSC, faster time to advanced airway placement, and may increase survival at longest follow-up. Use of a SGA may have no effect on aspiration compared with tracheal intubation and an uncertain effect on survival with good functional outcome
Keywords: airway management, systematic review, cardiac arrest

PL02

The Canadian transient ischemic attack score as a predictor of ischemic lesion on magnetic resonance imaging in transient ischemic attack or minor stroke following a negative computed tomography scan

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Université Laval, Quebec, QC

Introduction: Patients with a clinical diagnosis of transient ischemic attack (TIA) or minor stroke with an acute infarction on brain imaging are at higher risk of subsequent stroke. Our goal was to establish if the Canadian TIA Score (CTS) could predict infarction on early magnetic resonance imaging (MRI) when an initial computed tomography (CT) scan was negative for stroke and aimed to establish clinical factors that are predictive of a positive MRI.
Methods: Patients were selected from the prospective cohort used for the derivation and validation of the CTS in 13 centers. Patients with negative CT scans who underwent MRI within 7 days of symptom onset were analyzed. The main outcome was cerebral infarction defined as MRI diffusion-weighted imaging (DWI) positivity. A multivariate logistic regression model determined associations between confirmed stroke and demographic characteristics, clinical features on history and examination, laboratory findings and medications. Subsequent stroke rate at 7, 30 and 90 days was also analyzed.
Results: From 11507 patients, 1048 met our inclusion criteria. MRI positivity was 15.4%, 30.4% and 50.0% for the low, medium, and high-risk CTS groups, respectively. Subsequent stroke/TIA were higher if ischemic lesions were confirmed on MRI at 90 days; stroke recurrence occurred twice (10.0%) in the low-risk group, 51 (22.3%) times in the medium-risk group and in 20 (24.7%) high-risk patients. 1.7% of all DWI negative patients had a subsequent stroke. Predictive factors of multivariable models for DWI positivity in the medium-risk group were male (odds ratio [OR] = 1.53; 95% confidence interval [CI] 1.11–2.12), hypertension (OR = 1.63; 95% CI 1.17–2.27), clinical features history of unilateral weakness (OR = 2.09; 95% CI 1.50–2.91), language disturbance (OR = 1.43; 95% CI 1.03–1.97) and the presence of a pronator drift on examination (OR = 2.18; 95% CI 1.37–3.47).
Conclusion: The CTS helps predict MRI findings and confirmed ischemic lesion is a strong predictor of the recurrence risk of stroke. The low-risk group showed few positive MRIs and had a lower recurrence rate justifying less urgent MRI imaging. In the medium-risk group, we highlighted findings that should raise the suspicion of an ischemic lesion and these patients should be prioritize for rapid investigation of stroke etiology and secondary preventive measures. In the high-risk group, patients remain at risk for stroke despite negative imaging and MRI should not delay management.
Keywords: diffusion magnetic resonance imaging, canadian transient ischemic attack score, stroke

PL03

The predictive performance of scripted call-taking triage assessed using a large emergency medical services dataset linked to outcomes

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Introduction: Triage of calls to 9-1-1 for medical emergencies determines the level of EMS response. Undertriage can lead to missed emergencies and poor outcomes; overtriage can lead to unnecessary lights-and-siren driving and diminished efficiency. Most North American services use computer-guided scripted triage implemented by non-clinicians, and the Medical Priority Dispatch System (MPDS) is used by the majority. There have been relatively few assessments of

the accuracy with which high-acuity patients can be differentiated from low-acuity patients at the time of the 9-1-1 call.
Objective: To evaluate the performance of the MPDS at predicting patient acuity based on a range of clinical outcomes.
Methods: We analyzed a dataset from a large urban EMS system accounting for 333,980 adult patient-encounters for the 2018–2021 period linked to outcome. Using the area under the ROC curve (AUC), we assessed the performance of the priority assigned at call-taking (dichotomized as high [Echo/Delta] vs low [Charlie/Bravo/Alpha/Omega]) in predicting risk of critical illness (Critical Illness Prediction score [CIP]; high [4–8] vs low/moderate [0–3]), paramedic intervention (time-sensitive vs non-time-sensitive), and post-transport morbidity (admission to ICU) and mortality (30-day survival).
Results: The MPDS system had an AUC of 0.68 for CIP, 0.63 for time-sensitive interventions, 0.69 for admission to ICU, and 0.61 for 30-days survival. The predictive performance was driven by low sensitivity (41–57%) and acceptable specificity (72–73%). Based on the average of the four clinical outcomes, for every 1000 high-priority dispatches, 936 patients did not show signs of high acuity, whereas for every 1000 low-priority ambulance dispatches, 28 patients did show signs of high acuity.
Conclusion: While not explicitly designed for this purpose, the MPDS poorly predicted patient acuity across a range of outcome measures. These results suggest an opportunity to improve or augment the MPDS to more accurately assess acuity at the time of the 9-1-1 call. Secondary triage by medically trained professionals and machine-learning models trained on a caller's past medical history and healthcare utilization may improve risk-prediction at call-taking.
Keywords: 911 call taking, medical priority dispatch system, prehospital

PL04

A longitudinal study on Canadian emergency physician burnout levels during the pandemic

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Introduction: Burnout is a serious work-related syndrome involving emotional exhaustion and depersonalization which can lead to workforce depletion, depression and suicide. Emergency physicians have always been affected by burnout but the COVID-19 pandemic may have increased emergency physician burnout levels. Our aim was to report Canadian emergency physician burnout rates in October 2022, and to compare to burnout levels reported by the same physicians in November 2020.
Methods: This is a national longitudinal survey of Canadian emergency physicians focused on physician wellness. The survey cohort launched in April 2020. In November 2020 and October 2022, participants were invited (by email or text) to complete the Maslach Burnout Inventory (MBI) Human Services Survey for Medical Personnel. The survey was also advertised on Twitter and was disseminated in both English and French. An additional three reminders were sent to nonresponders. For the October 2022 survey, we report the proportion of participants with high emotional exhaustion or depersonalization levels (emotional exhaustion score ≥ 27, depersonalization score ≥ 10). Analyzing participants who responded to both our 2020 and 2022 MBI surveys, we compared the proportion of participants reporting high emotional exhaustion or high depersonalization in 2020, compared to 2022 and the average scores.
Results: The response rate for the 2022 survey from those previously enrolled in our longitudinal survey was 65% (386/595). Five additional participants responded to the 2022 survey advertised on social media. 309 respondents had also completed the 2020 MBI survey. There was at least one participant in every province and territory in Canada, except Yukon in the 2022 survey. The mean age was 44 years, 51% were women, 60% had children living at home, 7% were resident physicians. High emotional exhaustion was reported by 225/383 (59%) and high depersonalization 245/383 (64%) in the 2022 survey. Among the 309 participants who completed both surveys, 41% reported high emotional exhaustion in 2020 compared to 57% in 2022 ($p < 0.001$), and average scores increased from 2.7 to 3.3 ($p < 0.001$). 51% reported high depersonalization in 2020 compared with 63% in 2022 ($p = 0.004$) and average scores increased from 1.2 to 2.6 ($p < 0.001$).
Conclusion: Most emergency physicians responding to our 2022 survey experienced high burnout and burnout levels in respondents increased during the pandemic.
Keywords: burnout, physicians, pandemic

Lightning oral

LO01

The impact of a forced pause on medical student cognitive load, performance, and experience in simulated resuscitation training

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Introduction: Acute mental stress experienced by emergency healthcare providers can lead to increased distractibility and avoidable medical errors. Taking a pause, the conscious act of temporarily stopping performance, grants time for other cognitive activities. It has been theorized taking pauses may enhance performance in simulation training, possibly by lowering cognitive load (CL). However, there is little primary research on this topic. This study aimed to evaluate the impact of a forced pause on medical student CL, performance, and experience during simulated resuscitation training.
Methods: A mixed-methods study was conducted at Queen's University (Ontario) to assess the effect of pausing on medical students during a ventricular fibrillation simulation case. Participants were assigned to either a no-pause control group or a pause group whereby a 30s pause was initiated 10s after an observed change in the patient's status. After the case, individual CL questionnaires were completed and semi-structured focus group interviews were run. Descriptive statistics were generated for CL and performance data. Inductive thematic analysis of interview transcripts in NVivo was conducted.
Results: 52 medical students consented to participate. There were no significant differences in CL between the pause and control groups, but a trend of leaders having higher CL than non-leaders was observed. There was no impact of the pause on performance. Three major themes emerged from analysis of interview transcripts: (1) Highest Cognitive Load, (2) Perception of Pause, and (3) Perceived Performance. CL was highest when adapting to a new role, taking a history, responding to distractors, and when the patient lost a pulse. The pause was helpful to establish roles and discuss next steps. Those

with lower reported CL did not find the pause as useful. Many participants attributed a lack of medical knowledge to poorer individual performance. Team functioning, especially leadership, was overall well-executed.
Conclusion: To our knowledge, this study is the first of its kind to evaluate the effect of a pause on medical student CL in a simulation environment. While no difference in CL and performance between groups were identified, the pause permitted time to regroup and refocus on the simulation and subsequently reduced reported stress levels. Further data is required to better understand the impact of pausing on CL as implementing pause training for medical learners is considered.
Keywords: cognitive load, simulated resuscitation training, medical pause

LO02

A survey of a novel procedural palliative medicine point-of-care ultrasound course

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Introduction: PoCUS is becoming increasingly used in palliative care (PC) to manage patients in their homes, hospice, or palliative care units and therefore reduce the need for transportation. The Department of Emergency Medicine held a 1-day procedural palliative PoCUS course in 2020 which we believe to be the first of its kind for PC physicians in Canada. This pilot survey evaluated the use of PoCUS and patient benefits attributable to the course compared to those who did not take it.
Methods: PC physicians completed four online surveys: (1) a survey by participants immediately following the course, (2) a comparative survey by non-participants immediately following the course, (3) a survey by participants 6-months following the course, and (4) a comparative survey by non-participants 6-months following the course. All surveys contained binary, multiple choice, open-ended, and 5-point Likert scale questions.
Results: Surveys were completed by 26 physicians, 13 of whom participated in the PoCUS course. 61.5% of participants and 50% of non-participants reported never using PoCUS prior. At 6 months, 53.9% of participants reported using PoCUS at least several times per year and 23.1% at least once a month. PoCUS use increased in non-participants in the 6-months survey, with fewer (23.1%) reporting never using PoCUS and 38.5% reporting use at least several times per year. At 6 months, all participants found the PoCUS-guided paracentesis, bladder, and FAST scans useful in their practice. Scans for pleural effusions, pericardial effusion, and PoCUS-guided thoracentesis were felt to be useful by most (84.6%, 76.9%, and 61.5% respectively) participants. Lung scans for pneumonia, DVT scans, and PoCUS-guided IVs were the most desired applications for future training by participants. The greatest challenges of integrating PoCUS into the participants' practice were maintaining skills (66.7%) and equipment access (33.3%). All course participants at 6 months reported benefits, including improved patient comfort and symptom management (84.6%), timely care (76.9%), avoided transportation (76.9%), and avoided comprehensive investigations (69.2%). There were no cases of harm due to the use of PoCUS reported.
Conclusion: The introduction of a procedural palliative PoCUS course led to increased PoCUS use and physician reported patient benefits among this group of PC physicians. There were no reported cases of patient harm. Skill maintenance and lack of equipment appear to be the main challenges limiting PoCUS use in PC.
Keywords: innovations in emergency medicine education, ultrasound, palliative

LO03

The influence of clinical coaching teams on quality of entrustable professional activity assessments

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Introduction: Coaching is an important component of workplace-based assessment in Competency Based Medical Education (CBME). Longitudinal coaching relationships have been proposed to enhance the trainee-supervisor relationship and promote high quality assessment. The objective of this study was to determine the influence of longitudinal coaching relationships on the quality of Entrustable Professional Activity (EPA) assessments.
Methods: EPAs completed by Emergency Medicine (EM) supervisors when paired with EM trainees as their longitudinal coach between July 2020 – June 2021 were extracted. Three physicians were recruited to rate 174 EPAs using the Quality of Assessment and Learning (QuAL) score, a previously published measure of EPA quality. An analysis of variance was performed to compare mean QuAL scores between EPA assessments completed by supervisors when a coaching relationship existed ($n = 87$) with those completed by the same supervisors with no coaching relationship ($n = 87$). Linear regression analysis was conducted to examine the relationship between trainee performance (EPA rating) and EPA assessment quality (QuAL score).
Results: All raters completed the survey. The mean QuAL score in the coaching relationship group (3.63, $SD = 0.91$) was higher than the no coaching relationship group (3.51, $SD = 1.10$) but the difference was not statistically significant ($p = 0.40$). Supervisor was a significant predictor of QuAL score ($p = 0.012$) and supervisor alone accounted for 26% of the variability in QuAL scores ($R^2 = 0.26$). There was no significant relationship between trainee performance and EPA assessment quality.
Conclusion: The presence of a longitudinal coaching relationship did not influence the quality of EPA assessments.
Keywords: CBME, coaching and feedback, continuity of supervision

LO04

Comparison of peer-assisted learning with expert-led learning in medical school ultrasound education: a systematic review

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Introduction: Teaching ultrasound to medical students is resource intensive. Peer-assisted learning (PAL), where the teacher can be a medical student, may be a feasible complement to expert-led learning (ELL). The objective of this systematic review was to compare attainment of practical ultrasound (US) knowledge and skills of medical students receiving PAL or ELL.
Methods: This study was registered with PROSPERO and was reported using PRISMA. A peer-reviewed librarian search of MEDLINE, Embase, ERIC, Education Source, Scopus, and Web of Science was performed from database inception to November 2022. Inclusion criteria were randomized controlled trials of undergraduate medical student learners comparing ultrasound teaching with PAL and ELL. The primary outcome was attainment of practical US skills, defined as US image acquisition and/or image generation. Data extraction included: sample size, learner/tutor education level,

curriculum, and practical test scores. Two reviewers independently screened articles and extracted data (disagreements resolved by third reviewer). The Cochrane risk-of-bias tool for randomized trials (RoB2) was used to assess study quality.
Results: The search yielded 2890 articles; 1473 duplicates were removed leaving 1417 unique citations. Thirty-seven articles underwent full-text screening and eight studies met full inclusion criteria. The sample sizes of the eight studies ranged from 24 to 151 for a total of 630 participants. The included studies taught abdominal (3), cardiac (4), lung (1), and musculoskeletal (3) US skills. The studies were conducted in Germany (6), Israel (1) and the USA (1). Five studies showed no significant difference in practical assessment scores between students taught by PAL vs ELL. In one study the PAL group scored superior to the ELL group ($p = 0.001$). In another study the ELL group scored higher than the PAL group ($p < 0.05$). A third study found that ELL was superior to PAL in participants attaining a passing (60%) score ($p = 0.01$), but not attaining an advanced 80% score ($p = 0.3$). Most studies (7/8) had some concerns regarding risk of bias in the domains outlined in the RoB2 tool.
Conclusion: The majority of included studies found no significant difference in practical US skills between PAL and ELL. One study demonstrated superiority of PAL and two studies of ELL. Based on this systematic review, PAL is a reasonable complement to ELL for teaching practical ultrasound skills to medical students.
Keywords: ultrasound, medical education

LO05

Home field advantage? – Comparing the quality of EPA observations completed on- versus off-service

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Introduction: There is increasing evidence to suggest that supervisors exhibit different assessment behaviours when supervising off-service versus on-service residents. As programs of assessment rely on collecting robust performance data to inform high-stakes decisions about resident progress and promotion, it is important to examine the quality of such inputs. Therefore, this study compared the quality of entrustable professional activity (EPA) assessments generated for residents on-service versus off-service.
Methods: This retrospective database study compared the quality of on- and off-service EPA assessments as measured by the Quality of Assessment of Learning (QuAL) score, a previously published measure of EPA quality that has demonstrated strong psychometric characteristics including reliable scores and the ability to discriminate assessments based on utility. Fifty EPA assessments (25 on- and 25 off-service) were rated for five different EPAs (three non-procedural and two procedural) by three blinded raters. QuAL scores were analysed using a factorial ANOVA.
Results: Mean QuAL scores for EPAs completed on-service were significantly higher than those completed off-service with (3.57 ± 1.07 versus 2.67 ± 1.01, $p < 0.001$). Post-hoc analysis demonstrated that this was true for the following EPAs: resuscitating/coordinating care ($p = 0.003$); airway management/ventilation ($p < 0.001$); and managing emergency mental health conditions ($p = 0.007$).
Conclusion: This study provides insights for educators about how data from on- versus off-service environments differ, which potentially can impact downstream, high-stakes decisions made by competence committees. Our study suggests that currently on-service EPA assessments are of higher quality. Future work should explore whether or not faculty development initiatives could improve assessment quality completed by physicians in other specialties. If not, consideration could also be given to the use of other assessment tools for when residents are off-service.
Keywords: medical education, quality of assessment of learning (QuAL) score, entrustable professional activities (EPAs)

LO06

Back from the brink: a novel approach to clinician-scientist training

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Innovation Concept: Clinician-scientists are an increasingly endangered species and the opportunity to develop scientific expertise during residency is limited. In 2018, the Canadian National Consensus Conference identified several threats to the dwindling population of clinician-investigators and criticized traditional pathways for investigator development (e.g., MD-PhD, Clinician Investigator Program (CIP)) as either too arduous, or inadequate to develop necessary skills to be a competitive investigator. In their summary, the consensus group proposed recommendations including the need for (a) non-traditional training pathways and (b) training on a continuum. We have developed a longitudinal, skills-oriented fellowship including protected research time throughout a five-year emergency medicine residency with the explicit aim of developing a clinician-scientist who can maintain a research program after training.
Methods: This program features scientist co-supervision (Centre for Education Research and Innovation, Dept. of Psychology) with emergency physician support for all projects. Competencies for this fellowship reflect those prescribed by the Royal College CIP, minus the requirement for a post-graduate degree.
Curriculum, Tool or Material: The curriculum is designed to foster expertise in multiple methods of inquiry while developing ethics and grant-writing skills, and acquiring the organizational, collaborative, and supervisory capacities necessary to support a research program. Specific, skills-oriented objectives are developed iteratively in collaboration with the candidate as they refine their research interests and identify gaps in their knowledge.
Conclusion: Here we present a novel training pathway to foster a clinician-investigator within the context of their residency training. Evaluation at the halfway point of the fellowship reveals a high degree of learner engagement and satisfaction and that the candidate has acquired a skillset of research fundamentals required to initiate and see a research project through publication. The candidate's behaviour has developed towards a more programmatic and collaborative research approach as they learn to align research projects, build collaborative teams, and supervise research students and volunteers. In terms of tangible scholarly outcomes, this fellowship has yielded 1 study published in a peer reviewed international emergency medicine journal, 3 abstracts presented, and 3 new studies approved by ethics and underway.
Keywords: innovations in emergency medicine education, clinician-scientist, research fellowship

LO07

Creating fairness in residency selection in a CCFP-EM program by redesigning selection tools

M. Bhimani, K. Chawla, A. Gu

Innovation Concept: The Canadian Resident Matching Service (CARMS) states, "fairness and equity are foundational principles of the match process." To establish equity in our selection process for CCFP-EM candidates, a 'CaRMS Fairness Committee' (CFC) was created to redesign resident selection. A study was conducted to determine if the new process improved diversity in gender and location of prior training in the residents ranked. We hoped to select more diverse residents in multiple domains including gender, location of prior training and ethnicity, and to remove implicit biases in resident selection. Our study was limited to two parameters that served as markers for diversity in the residents ranked.
Methods: Workshops held by the CFC identified biases in previous selection methods that weighed heavily on local exposure and certain clinical encounters. Other biases included emphasis on interesting experiences, as well as emphasis on courses and conferences that may not be globally accessible. A new process proposed to eliminate such biases by focusing on merit based qualities over experiences. The file review and interview tools were redesigned with rubrics that sought to eliminate implicit biases. A study was designed to evaluate early data from a new residency selection method.
Research Ethics Board approval was obtained. Gender, school of Family Medicine (FM) residency, and location of Medical School training data was collected from CaRMS for the 2018-2021 match years. Proportions were compared 2 years before and 2 years after the formation of the CFC using chi-squared testing.
Curriculum, Tool or Material: Prior to the CFC work, successfully matched applicants were 20% non-local, vs 36.8% non-local residents after the new method, a 16.8% increase (95% CI − 11.1 to 41.9%; $p = 0.25$). Previously, only 25% of final program cohort was female. After implementing the new process, 53% of the program cohort was female, a two-fold increase (Δ27.6%, 95% CI − 2.7 to 51.9%; $p = 0.08$). Following the changes, our data showed an increase from 55 to 90% of matched applicants having attended a non-local medical school (Δ34.5% 95% CI 6.2 to 56.6%; $p = 0.02$).
Conclusion: Early limited results from our data show that tools created to reduce implicit biases in residency selection do work to create a more diverse group of candidates ranked to a residency program and potentially improve diversity in an incoming cohort. This work is necessary to reduce biases in residency selection. Our tools and methods are available for other programs to consider.
Keywords: innovations in emergency medicine education, redesigning CARMS to remove biases, fairness in CARMS

LO08

Rural and remote resuscitation simulation program (RnR rounds): a monthly hybrid in-person and virtual simulation program for rural physicians to practice resuscitation skills, well-received in either attendance method

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Innovation Concept: Emergencies in rural and remote locations present unique challenges to physicians educationally and clinically. Educationally, simulation opportunities may be limited. As simulation is an effective training tool, a simulation program can be developed to help rural and remote physicians improve resuscitation skills, where certain resources and additional clinical support may not be readily available. The Rural and Remote Resuscitation Simulation Program ("RnR Rounds") was developed for rural physicians to practice resuscitation skills. Participants can attend in-person or virtually. The goal was to provide a hybrid attendance method so that participants could attend in-person or virtually, if they could not be in-person. Literature suggests that observer roles are useful for learning; virtual participation through observation and involvement in debriefing may be just as valuable as hands-on simulation practice.
Methods: RnR launched in Calgary in 2020. A monthly 2-h simulation session was hosted in a simulation centre, containing two cases. Session participants (up to ~10) include physicians and residents. Virtual participants can choose to volunteer to run cases as a resuscitation team leader, virtually. Participants completed monthly post-session evaluation surveys to provide feedback.
Curriculum, Tool or Material: The RnR program had a monthly simulation theme (e.g., sepsis, shock, trauma). Simulation facilitator manuals were designed by the leadership team based on literature and latest clinical practice guidelines. Virtual participants joined by using Zoom Videoconferencing or the Double Telepresence Robot.
Conclusion: The average score (out of 7) was minimally higher (0.23-point difference, or 3%) for in-person participant surveys (6.31, $n = 29$) versus virtual participant surveys (6.08, $n = 12$), and this was not statistically significant ($p = 0.45$, two-tailed t-test). Feedback identified debriefs and complexity of cases as positives for virtual participants. Feedback identified challenges surrounding contributing verbally as a virtual participant. RnR Rounds is a flexible and accessible monthly simulation program for rural resuscitation practice. Participants can join in-person or virtually, and there is no significant difference in satisfaction in either attendance method. Educators can consider including rural and remote practitioners in simulation activities by broadcasting live simulation training days and simultaneously involve both in-person and virtual participants during the cases and debriefs.
Keywords: innovations in emergency medicine education, simulation, rural medicine

LO09

A survey of needs and expectations for artificial intelligence according to Canadian emergency physicians

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Introduction: Artificial Intelligence (AI) is recognized by emergency physicians (EPs) as an important technology that will affect clinical practice. There are many clinical AI-tools in development, but the most high-yield uses for AI according to EPs is not well understood. To understand how AI can be used most effectively, clinician surveys have been conducted within other medical specialties to guide future design. However, similar needs-assessments for emergency medicine do not exist. This study aims to identify which work-activities are highest priority for developing new AI-tools for patient care in the emergency department in the next 10 years.
Methods: A mixed-method electronic survey of Canadian EPs was conducted from Jan-May 2022. The survey was implemented using Opinio (ObjectPlanet Inc., Norway), and participants were contacted using the CAEP survey distribution service. The study was approved by the Research Ethics Board of Dalhousie University (File No. 1026940). Survey items include demographic and physician practice-pattern data, clinicians' current use and perceptions of AI, and individual rankings of which EPs work-activities most benefit from AI.

Results: The study's primary outcome is a ranked list of high-priority AI-tools for emergency medicine that physicians want translated into general use within the next 10 years. Top ranked specific AI examples include 'automated charting/report generation', 'clinical prediction rules' and 'monitoring vitals with early-warning detection.' When ranking by physician work-activities, 'AI-tools for documentation', and 'AI-tools for computer use' were the top items. Secondary outcomes considered EPs' confidence in AI to perform specific tasks and AI's overall potential; respondents indicated AI was 'likely' (43.1%) or 'extremely likely' (43.7%) to be able to complete the task of 'documentation' and they indicated either 'a-great-deal' (32.8%) or 'quite-a-bit' (39.7%) of potential for AI in emergency medicine.
Conclusion: Physician input on future AI-tools promotes user-centered design and helps to ensure the uptake of this technology. Translation of AI-tools to facilitate documentation is considered high-priority, and respondents had high confidence that AI could facilitate this task. However, the 'documentation' category is broad, including speech recognition, AI-powered scribes, and AI-powered patient medical record summaries. Future work should further investigate these sub-categories.
Keywords: artificial intelligence (AI), needs-analysis, survey

LO10

Electric scooter injury and trauma in Edmonton: a multi-center prospective and retrospective observational study

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Introduction: The establishment of rentable electric scooters (E-scooters) in Canadian cities has been associated with an increase in related injuries presenting to emergency departments (EDs). Since the burden of E-scooter related injuries varies by location and population, more data on injuries are required across Canada. The primary objective of the study was to determine the epidemiology of adult E-scooter related injuries presenting to Edmonton EDs.
Methods: Adult patients presenting to seven Edmonton EDs with E-scooter related injuries during three summers (2019-21) were eligible for inclusion. Participants were identified retrospectively through sports and recreation codes, automated text parsing algorithms to search ED triage notes for E-scooter related terms, and searching the local trauma registry. Participants were also enrolled prospectively in 2021 when ED team members were able to enrol patients using a faxable enrollment form. All charts identified were assessed for study inclusion by two independent reviewers. Data extraction and descriptive statistical analysis were performed by trained researchers.
Results: From 1014 unique ED visits, 759 E-scooter encounters were included. The median age was 28 and 49% were male. While 20% presented via ambulance, 14% were CTAS 1/2 and most (96%) had a GCS $= 15$. Multiple injuries were common (62%), and most frequent body regions injured were the upper (29%) and lower (23%) limbs, and head (17%). Helmet use was infrequent (2%) and alcohol use was suspected in 26% of cases. Laboratory testing was uncommon (19%); however, simple (70%) and advanced (20%) imaging were often performed. The median physician initial assessment was 102 min. Overall, 6% were admitted and 9% received surgery within 30 days of the index visit. The ED length of stay was 4 h for discharged patients and 10 h for admitted patients; patients were admitted for a median of 2.5 days.
Conclusion: Injuries resulting from E-scooter related crashes are increasingly common presentations to high-volume EDs in this city. Those injured are young and the sex distribution was balanced; however, they consume ED resources and time, often require surgical interventions and follow-up needs are frequent. Legislative changes (e.g., mandatory helmet use) and other injury prevention strategies should be considered to reduce the burden of these injuries.
Keywords: e-scooter, injury, trauma

LO11

External validation of the Fresno-Quebec clinical decision rule to rule out concomitant fractures without radiographs in anterior shoulder dislocation: a multicenter retrospective cohort study

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Introduction: Glenohumeral dislocation is a common reason for emergency department (ED) consultation, and physicians may order a radiograph to rule out a concomitant fracture. The Fresno Quebec rule (FQR) intends to identify patients who require a radiograph before reduction to avoid systematic imaging. However, this novel approach needs external validation. We aimed to evaluate the performance of the FQR. Secondary objectives were to assess the proportion of potentially preventable radiographs and to identify risk factors associated with a significant fracture.
Methods: We conducted an external, multicenter, retrospective, validation cohort study from 2015 to 2021. Data were extracted from three ED university-affiliated tertiary-care centers in Lyon city (France). Patients aged ≥ 18 years with a final diagnosis of anterior glenohumeral dislocation were included. Accuracy metrics were the sensitivity (Se), specificity (Sp), negative predictive value (NPV) and positive predictive value (PPV) of the FQR. Multivariable logistic regression was used to model the risk of fracture.
Results: A total of 2129 patients were included (9.7% with a concomitant fracture). Patients in the complicated dislocation group were older (66 [52–80] *vs* 32 [23–57] years, $p < 0.001$) and less frequently male (54.1% *vs* 73.4%, $p < 0.001$). The most common types of fracture were those of the greater tuberosity (71.0%) and glenoid fossa (15.5%). The performance metrics of the FQR were as follows: Se 0.96 CI 95% [0.92;0.98], Sp 0.36 [0.34;0.38], PPV 0.14 [0.12;0.16], NPV 0.99 [0.98;0.99]. A total of 678 radiographs could have been avoided, corresponding to a reduction of 35.2% in prescriptions. This would have also resulted in 9 diagnostic errors (4.3%). All age categories ≥ 40 years were associated with a greater risk of fracture, such as first dislocation episode (OR $= 3.18$ [1.95;5.38]; $p < 0.001$), road collision (OR $= 6.26$ [2.65–16.1]), fall from patient height (OR $= 3.49$ [1.66;8.28]), fall from high (OR $= 3.95$ [1.62–10.4]), and seizure or electric shock (OR $= 10.6$ [4.09–29.2]).
Conclusion: The FQR has excellent sensitivity for identifying concomitant fractures among patients with anterior glenohumeral dislocation admitted to an ED. Using this clinical decision rule could lead to a 35% reduction in unnecessary radiographs and avoid associated health care costs, radiation exposure and prolonged length of stay.
Keywords: glenohumeral dislocation, radiograph, clinical decision rule

LO12

Predicting the severity of head injury: is time ripe for a senior-friendly Glasgow coma scale?

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Introduction: Prompt identification of traumatic brain injury (TBI) severity is critical, especially in older adults who are at higher risk for

mortality and undertriage. Nevertheless, Glasgow Coma Scale (GCS) might lack sensitivity in older adults.
Objective: This study aimed to investigate the effect of age on the association between the GCS and the anatomical brain lesion severity.
Methods: Design, settings, and participants: We conducted a multicentre retrospective cohort study (2003-2017) based on patients aged $\geq$ 16 years presenting with a TBI.
Outcomes measure and analysis: Structural damages were coded as per the Abbreviated Injury Scale [AIS] from 3 (serious) to 5 (critical). GCS were compared between younger (16–64 years) and older adults ($\geq$ 65 years). Multivariable logistic regressions were computed to assess the association between age and mortality. All analyses were conducted among isolated TBI and polytrauma patients.
Results: A total of 12,562 patients (75.5% were isolated TBI patients) were included. Older adults represented 52.0% (n = 4934) of polytrauma patients and 29.0% (n = 891) of patients with an isolated TBI. Mean GCS scores were higher in older adults at all maximum AIS_{head} ($MAIS_{head}$)-based severity levels and the most significant clinical difference in GCS was in patients with critical TBI ($MAIS_{head} = 5$; isolated TBI: 11.4±4.5 *vs* 8.5±4.9; polytrauma: 13.2±3.3 *vs* 11.6±4.4, $p < 0.001$). This was not related to the GCS motor component. Older adults with polytrauma had a higher risk of mortality compared to their younger counterparts regardless of trauma severity ($MAIS_{head} = 3$: OR = 2.9, 95%CI [1.6;5.5]; $MAIS_{head} = 4$: OR = 2.7 [1.6;4.7]; $MAIS_{head} = 5$: OR = 2.6 [1.9;3.6], all $p < 0.001$). Similar results were found in isolated TBI patients.
Conclusion: Despite similar structural damages, older adults with a TBI consistently present with a higher GCS than their younger counterparts. This challenges the paradigm that GCS could be used alone and equally across all age groups to define TBI severity. Different GCS thresholds may be needed in older adults, and future research should focus on developing a new senior-friendly GCS.
Keywords: head injury, geriatrics

LO13

Reliability of the safety threats and adverse events in trauma (STAT) taxonomy in assessing video-recorded trauma resuscitations

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Introduction: Trauma resuscitation is defined by critical resuscitative actions based on clinical decision-making, completed in an unpredictable and constantly changing environment. For this reason, trauma resuscitation is prone to adverse events (AEs). The Safety Threats and Adverse events in Trauma (STAT) taxonomy group 67 identified trauma AEs into nine distinct categories and was developed through expert consensus. It provides a framework for standardized analysis of trauma resuscitations and creates a foundation for targeted quality improvement and patient safety initiatives. The objective of this study was to evaluate the inter-rater reliability of the STAT taxonomy for adverse events identified during video-recorded trauma resuscitations.
Methods: High-definition audiovisual data from 30 trauma resuscitations were reviewed from a single centre. Videos were assessed and scored by four independent reviewers (two trainees and two staff). The STAT taxonomy was used to score identified AEs, based on binary responses in which yes is scored as 1, and no is scored as 0. Data collected and analysed included demographics, mechanism of injury, injury severity score, and the frequency and types of AEs identified. Inter-rater reliability was calculated using Gwet's AC1.
Results: Out of the 30 patients, 66.7% were male (mean age 38.8 years). 80% of cases were blunt trauma. The most common AEs identified in the videos were failure to measure temperature (86.7%) and inadequate personal protective equipment (86.7%), followed by failure to use closed-loop communication (76.7%). The agreement on all AEs between reviewers was 0.94 (95% CI: 0.93–0.95). The Gwet's AC1 agreement across the 9 AE categories was paramedic handover (0.82), airway and breathing (0.99), circulation (0.95), assessment of injuries (0.91), management of injuries (0.96), procedure-related (0.97), patient monitoring and IV access (0.99), disposition (0.98), team communication and dynamics (0.87).
Conclusion: The STAT taxonomy demonstrated excellent inter-rater reliability between reviewers and can be used to identify AEs in video-recorded trauma resuscitations. These results provide a foundation for adapting video review to quantify and assess AEs in the trauma bay objectively. Further studies should compare the STAT taxonomy with other team performance tools, evaluate construct validity, and assess the correlation between AEs and patient outcomes.
Keywords: adverse events, inter-rater reliability, trauma

LO14

Machine learning-based prediction of pregnancy success among ED presentations of early pregnancy bleeding: a pilot study

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Introduction: Bleeding in early pregnancy is a common obstetric presentation in the emergency department (ED) and prognosis is difficult to assess. Clinical, demographic, and laboratory markers have been investigated separately in prior studies in an effort to predict the risk of miscarriage; however, they have not been integrated into a scoring system for prognostication. This pilot study aimed to derive a simple point-based clinical risk scoring system (**Li**ve **B**irth **Risk** Score *[LiBRisk]*) using a systematic machine learning (ML) framework for determining the probability of pregnancy success/failure among women presenting to three Canadian EDs with early pregnancy bleeding prior to 20 weeks gestation.
Methods: We utilized data collected via a structured questionnaire and supplemented it with information from clinical charts and the ED information system. Following univariate comparisons of variables between the pregnancy success and failure groups, we split the entire cohort randomly into the training, validation, and test sub-cohorts in a ratio of 7:1:2, respectively. We then derived *LiBRisk* using the novel ML-based AutoScore framework, followed by parameter finetuning and receiver operating characteristic analysis to determine its predictive power and accuracy parameters.
Results: Two hundred patients were enrolled and 115 (55%) suffered a miscarriage. Among 47 variables incorporated into the random forest, a parsimony plot showed that the following five variables were most important in determining the risk of pregnancy success: β-HCG level, gestational age, maternal age, duration of vaginal bleeding, and diastolic blood pressure. Each was assigned an integer score, and a final score was obtained by summing individual points, in the range of 0–20. *LiBRisk* performed reasonably well (AUC = 0.83; 95% CI 0.77–0.90), with an optimum cut-off score of 15 for prognostication.
Conclusion: We developed *LiBRisk*, a readily accessible point-based predictive tool for determining the probability of eventual pregnancy success/failure in women presenting to the ED with early pregnancy

bleeding. Despite lagging slightly behind a similar non-ML-based model, it was more parsimonious, easy to implement, and comprehend in the busy ED setting. Further studies are needed to enhance the scoring capabilities of *LiBRisk* by way of large-scale internal and external validation exercises, while incorporating more relevant clinical and laboratory parameters.
Keywords: machine learning, artificial intelligence, early pregnancy loss

LO15

Maternal emergency department use before pregnancy and infant emergency department use after birth

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Introduction: Maternal emergency department (ED) use before or during pregnancy is associated with worse obstetrical outcomes. Reasons include pre-existing medical conditions and challenges in accessing healthcare. It is not known whether maternal pre-pregnancy ED use is associated with higher use of the ED by her infant. The objective of this study was to examine the relationship between maternal pre-pregnancy ED use and risk of infant ED use in the first year of life.
Methods: Utilizing provincial administrative health databases, this retrospective population-based cohort study included all women with a singleton hospital livebirth in Ontario between June 1, 2003 and January 31, 2020. Pre-pregnancy ED use was defined as any maternal ED encounter within 90 days before conception. Modified Poisson regression was used to generate relative risks (RRs), absolute risk differences (ARDs), and 95% confidence intervals (CI) of any infant ED visit within 365 days after the index birth hospitalization discharge date and were adjusted for maternal characteristics.
Results: ED use in the first year of life was higher among infants whose mother had visited the ED before pregnancy (570 per 1000) vs. those whose mother had not (388 per 1000) – RR 1.19 (95% CI 1.18–1.20); ARD 91.1 per 1000 (95% CI 88.6–93.6). Compared to women without a pre-pregnancy ED visit, the RR of infant ED use in the first year was 1.19 (95% CI 1.18–1.20) if its mother had 1 pre-pregnancy ED visit, 1.18 (95% CI 1.17–1.20) following 2 visits, and 1.22 (95% CI 1.20–1.23) after 3+ maternal visits. A low-acuity maternal pre-pregnancy ED visit was associated with an adjusted odds ratio (OR) of 5.52 (95% CI 5.16–5.90) for a low-acuity infant ED visit, which was numerically higher than the pairing of a high-acuity ED use between mother and infant (OR 1.43, 95% CI 1.38–1.49).
Conclusion: Pre-pregnancy maternal ED use forecasts a higher rate of ED use in her infant, especially for low-acuity ED use. This paired pattern may offer a useful trigger for health system interventions aimed at reducing some ED use in infancy.
Keywords: pregnancy, infant, emergency utilization

LO16

Pathways to cancer care after a suspected cancer diagnosis in the emergency department: a survey of emergency physicians across Ontario

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Introduction: Patients are increasingly being diagnosed with cancer in the emergency department (ED). Ensuring access to definitive cancer care from the ED is challenging given the episodic nature of ED care. Outpatient management is likely inconsistent, dependent on local resources available to treating physicians and may be hospital-specific. The objective of this study was to examine variability in management for 10 cancer diagnoses between EDs across Ontario.
Methods: We developed an electronic survey using Qualtrics to ask emergency physicians across Ontario where they would refer a patient who could be discharged with one of ten new or suspected cancer diagnoses in the ED. Options for referral included: in-ED consult, general medical or surgical clinics, surgical or medical oncology clinics, specialized cancer clinics, etc. The survey was pilot tested and feedback was incorporated prior to being electronically distributed. Preliminary data are described using frequencies for each cancer. The variance partition coefficient (VPC) was calculated to determine variation in referral options attributed to differences between hospitals, with physicians nested in hospitals.
Results: 146 physicians from 30 ED sites responded. Across most cancers, the majority of physicians referred to general surgical specialty clinics for further work-up, however, this ranged from 30.5% for lung cancer to 72.1% for head and neck cancer. In patients with unknown primary malignancy, the majority of physicians referred to internal medicine in-ED (34.8%) or clinic (34.1%) for work-up. Few physicians referred directly to surgical or medical oncology (0.7–16.3% of cancers) from the ED. Comments suggest this may be due to some oncologists requiring tissue confirmation of malignancy. Most referrals to specialized clinics were for suspected lung or breast cancer, however, these clinics appear to only be available at some sites. For many cancers, physicians commented they would discuss with on-call specialists to expedite referrals but there was no way to know timing of referral, which could be distressing for patients and providers. Variance in referrals between hospitals was least for breast cancer (VPC = 1.95%) and highest for unknown primary malignancies (VPC = 43.7%).
Conclusion: Physician management of new cancers varies between EDs and is specific to cancer type. Standardized management of patients with newly diagnosed cancer in the ED is needed to ensure equitable and timely access to cancer care across Ontario.
Keywords: cancer, diagnosis

LO17

Evaluation of physicians' practices and knowledge regarding the treatment of acute uncomplicated diverticulitis

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Introduction: Recent international guidelines recommend treatment without antibiotics (ATB) for acute uncomplicated diverticulitis (UD). Our objectives were to assess physicians' current knowledge and practices regarding UD treatment and to identify obstacles to practice change.
Methods: A Web-based survey (09/2022 to 11/2022) was emailed to general surgeons, emergency physicians and gastroenterologists through their provincial associations, and to general practitioners via their Quebec University Family Medicine Group. Physicians who did not treat diverticulitis were excluded.
Results: The overall response rate was 16%. A total of 466 participants consisting of general practitioners (41%), general surgeons (29%), emergency physicians (18%), residents (7%) and gastroenterologists (5%) answered the survey. Most participants (43%) were exposed to one to five episodes of diverticulitis monthly. Among them, 82% had heard of the no ATB strategy for UD; 8% reported

being "uncomfortable" and 45% "somewhat uncomfortable" while only 13% felt "very comfortable" with this practice. A third (32%) of all physicians was unaware of the guidelines on UD treatment. Most physicians reported "never" (42%) or "rarely" (25%) treating UD without ATB whereas 17% and 4% respectively reported using "sometimes" and "often" the no ATB strategy.

Compared to primary care physicians (emergency physicians and general practitioners), almost all surgeons had heard of the no ATB strategy (75% vs. 99%; $p < 0.001$), they were more "comfortable" or "very comfortable" with it (40% vs. 66%; $p < 0.001$) and only a few were unaware of the guidelines (43% vs. 11%; $p < 0.001$).

When informed of the no ATB strategy, 29% and 51% of all physicians respectively indicated that this would change or could change their practice. The most common barriers restricting UD treatment without ATB were concerns about treatment failure (70%), lack of knowledge of the recommendations (67%), difficulty in carrying out a close follow-up (59%) and workplace culture (55%).

Conclusion: Physicians' knowledge of the guidelines recommending the treatment without ATB for UD and application of this practice appeared to be suboptimal. Practice change requires efficient knowledge transfer, education strategies and workplace consensus among all specialties involved in UD management.

Keywords: uncomplicated diverticulitis, antibiotics

LO18

Impact of the COVID-19 pandemic on in-hospital cardiac arrest care characteristics, CPR quality, and survival outcomes?

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Introduction: The Ottawa Hospital COVID-19 Code Blue policy requires all Code Blue team members to wear personal protective equipment (including masks, gowns, gloves, visors) for all in-hospital cardiac arrests (IHCA)—taking precious minutes to don before any cardiac arrest care can be initiated. We sought to determine the impact of this policy on IHCA care time intervals, CPR quality metrics, and cardiac arrest survival to hospital discharge.

Methods: This before-after study took place at The Ottawa Hospital (three campuses) 21 months before (July 1st 2018–March 31st 2020) and after the adoption of its COVID-19 Code Blue policy (April 2020–December 31st, 2021). We screened eligible cases identified using health records ICD10 codes and included all IHCA cases for which resuscitation was attempted in any of our clinical care settings (in-patient and ambulatory care clinics). We excluded cases where ongoing cardiac arrest care was initiated prehospital. We reviewed health records and CPR metrics using a piloted-standardized data extraction process. CPR metrics were acquired using ZOLL R-Series, X-Series, or AED-3 defibrillators, and measured by two investigators using RescuNet Code Review software. We present descriptive statistics, chi-square, and t-test analyses where appropriate.

Results: Characteristics of the before ($n = 272$) and after ($n = 272$) IHCA cases were: median age 69 vs. 66, male 64.3% vs. 62.5%, witnessed 77.2% vs. 86.0%, cardiac cause 25.7% vs. 20.2%, respiratory cause 15.1% vs. 19.9%, and initial shockable rhythm 12.5% vs. 14.3%. Time intervals (min:sec) increased for IHCA discovery to CPR start $n = 534$ (0:15 vs. 0:30; $p = 0.02$) and to 1st rhythm analysis $n = 409$ (1:13 vs. 2:17; $p = 0.0009$), while time to 1st shock $n = 142$ (8:33 vs. 8:13; $p = 0.81$) decreased. CPR metrics for 40 (before) and 20 (after) available IHCA cases were similar: total CPR duration (min:sec) (12:00 vs. 15:57), compression rate/min (118 vs. 119), depth (cm) (6.4 vs. 6.1), peri-shock pause (min:sec) (0:13 vs. 0:08), and chest compression fraction (85.7% vs. 81.3%). Survival to hospital discharge decreased (20.6% vs. 18.0%; $p = 0.46$).

Conclusion: The COVID-19 Code Blue policy delayed CPR initiation and 1st rhythm analysis which may have impacted survival. CPR quality metrics appeared unchanged but were only available from a small number of cases.

Keywords: cardiac arrest, in-hospital, COVID-19

LO19

Utility of pelvic examination in the assessment of women with early pregnancy bleeding: a multicenter Canadian emergency department study

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Introduction: Bleeding in early pregnancy is a common emergency department (ED) presentation. Although variability in approaches has been demonstrated, research is relatively uncommon on ED practices and outcomes. This study investigated the clinical pattern of care, utility, and contribution of pelvic examination at three Canadian EDs related to the diagnosis and management of bleeding in early pregnancy and explored factors associated with a change in clinical management after pelvic examination.

Methods: Data were collected from patients after obtaining informed consent and from treating ED physicians using a structured questionnaire. Patient telephone follow-up was supplemented by linking with patients' administrative data. We performed univariable and multivariate binary logistic regression analyses to identify factors associated with a change in patient management following pelvic examination in the ED. Inferences about diagnoses made before and after pelvic examination were compared to the diagnosis on formal ultrasound for internal consistency and agreement.

Results: Overall, 200 participants were enrolled; the mean age was 31 years, patients had bled for a median of 1 day, and stayed in the ED for a median of 5 h. Of these, 123 (62%) received a pelvic examination, including speculum examination and bimanual palpation. Factors significantly associated with a change in management after pelvic examination in the univariate logistic regression analysis were dark-red bleeding per vaginam, tachycardia, right lower quadrant tenderness, and bimanual palpation. In the multivariate logistic regression analysis, dark-red bleeding per vaginam was independently associated with a reduced likelihood of a change in management after pelvic examination (aOR = 0.207; 95% CI: 0.046–0.943; $p = 0.0418$). In reference to formal ultrasound findings, physician diagnoses made before and after pelvic examination yielded acceptable levels of internal consistency and significant moderate agreement (Cohen's $k = 0.586$; 95% CI: 0.363–0.809).

Conclusion: While several factors were significantly associated with a change in management after pelvic examination in this cohort, in our pilot study, none of these were associated with an increased odds of a change in management after this procedure. Until this debate is resolved, physician preferences and shared decision making with patients should guide practice regarding speculum examination for the ED management of bleeding in early pregnancy.

Keywords: early pregnancy bleeding, length of stay, management

LO20

Troponine cardiaque et tomodensitométrie cérébrale chez l'aîné qui consulte à l'urgence suite à une chute.

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Background and Aim Statement: La chute chez l'aîné est une raison de consultation fréquente aux urgences. Considérant la multiplicité d'étiologies existante, l'investigation peut varier. Toutefois, la pertinence d'effectuer certains tests systématiquement, notamment un test de troponines cardiaques et une tomodensitométrie cérébrale (TDM), ne semble pas basée sur des données probantes. Cette étude vise à décrire les pratiques actuelles d'investigation d'une chute chez les patients âgés. L'objectif secondaire est d'évaluer les facteurs prédictifs potentiels d'examens cardiaques et neurologiques spécifiques après une chute.
Measures and Design: Devis: Une étude de cohorte rétrospective multicentrique (5 urgences du CHU de Québec-Université Laval, Québec). Critères d'inclusion: Sélection aléatoire de patients âgés de 65 ans et plus se présentant aux urgences avec une plainte principale de chute en 2019. Recueil: Les données ont été recueillies via un formulaire électronique standardisé.
Evaluation/results: Cinq cents dossiers ont été inclus. L'âge moyen est de 85,9±8,4 ans, et 68,4% étaient des femmes. Un total de 256 (51,2%) patients ont eu au moins une investigation de troponines cardiaques et 18 (7,0%) avaient un résultat au-dessus de la limite supérieure, indiquant une suspicion d'ischémie myocardique. Après investigations, trois infarctus aigus du myocarde ont été diagnostiqués, deux décès d'origine cardiaque ont été relevées (un infarctus aigu du myocarde et une défaillance cardiaque) et une intervention coronarienne percutanée élective a été réalisée. Un total de 280 (58,4%) patients ont subi au moins une TDM et 16 (5,7%) avaient un nouveau saignement intracrânien à l'examen radiologique. Aucune variable n'a présenté une association statistiquement significative avec l'élévation de la troponine cardiaque. La présence d'au minimum une anomalie à la TDM est associée significativement avec le symptôme d'amnésie ($p < 0{,}0001$) et le nouveau déficit focal à l'examen neurologique($p = 0{,}0079$).
Discussion/impact: Les résultats obtenus révèlent un faible rendement diagnostique et pronostique de la mesure de la troponine cardiaque et de la TDM, ce qui ne tend pas à justifier la prescription systématique de ces types d'examens cliniques. La présence d'amnésie et de déficit focal à l'examen neurologique serait des facteurs prédictifs potentiels d'examen neurologique spécifique après une chute. Aucun facteur prédictif potentiel d'examen cardiaque n'a été identifié.
Keywords: fall, scan, troponin

LO21

Examining justice, equity, diversity, and inclusivity education provided by Canadian emergency medicine residency programs

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Introduction: Racism and biases against marginalized groups impact patient care in the emergency department (ED). Providing inclusive, safe, and equitable care, as well as attaining the skills required for effective advocacy work, requires knowledge that must be both taught and practiced. There have been calls for EM training to develop and implement equity, diversity, and inclusion (EDI) curricula to change practice and bridge this gap. We sought to characterize the current state of EDI education within Canadian residency programs including delivered curricula and programming, challenges and perceived barriers.
Methods: Using a cross sectional survey design, we collected anonymous data from Canadian FRCPC and CCFP(EM) program directors with respect to their existing EDI training curricula from Sept 14 to Nov 10, 2022. The survey was administered through Qualtrics. Thematic analysis was performed on qualitative data while summary metrics were calculated for quantitative data.
Results: Overall, the survey was completed by 9/14 FRCPC programs and 5/17 CCFP-EM programs. A majority (86%) of respondents had a formalized EDI curriculum with a mean of 5 (3–10) hours of instructional time/year. Delivery formats included lectures/seminars, journal clubs, and simulation. Five programs reported community expert involvement in curriculum design. 60% of respondents felt there was inadequate access to EDI education for trainees. Five programs had a faculty EDI education lead, and four positions were funded. Only one respondent felt that EDI was not a priority. 60% of respondents also endorsed that EDI curricula should be delivered at the level of the program or PGME. Common barriers identified to implementing/continuing an EDI curriculum included limited academic calendar time, difficulty developing new curricula, faculty knowledge of content areas, funding considerations, and defining learning objectives.
Conclusion: Broadly, EM program directors are supportive of an EDI curriculum with many common barriers identified. Many programs have designed and implemented their own curricula without national guidance or support. Time within the training program was the largest barrier identified for curriculum maintenance and implementation. Areas for future research would include a needs assessment for EDI curriculum development and implementation. Ultimately programs may be best supported working toward the development of a robust EDI curriculum nationally.
Keywords: innovations in emergency medicine education, equity, diversity

LO22

In situ simulation in the emergency department: identifying and addressing latent safety threats to promote patient safety

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Introduction: In situ simulation (ISS) has shown promise as a means of identifying latent safety threats (LSTs) that can be actioned upon to improve patient care. Using an ISS program, this project sought to uncover LSTs that arose during high acuity, low opportunity (HALO) emergency scenarios at two level 2 regional referral centers.
Methods: Ten ISS sessions were run in the emergency departments of the Victoria General and Royal Jubilee Hospitals in Victoria, B.C. Data was collected through formalized surveys as well as ad hoc notes during the sessions. LSTs were identified and key themes were developed using a framework analysis by two independent reviewers. Actionable items were identified and subsequently followed up.
Results: Four broad themes were identified that centered around communication, equipment access, infection control, and provider knowledge. The most common issues were around communication and equipment access, the latter of which represented critical LSTs of not having cooled crystalloids or a complete obstetrical tray during HALO scenarios. Follow-up revealed both of these issues had been corrected, with the access to cooled fluids and refresher training on hyperthermia playing a role in an uncharacteristic heat wave that occurred shortly after the simulation session.
Conclusion: ISS is an effective means of identifying LSTs that may have a direct impact on patient care. Whether through enhancing team communication or identifying physical workspace limitations, ISS is a

low-cost initiative to facilitate staff-directed improvements of emergency care, particularly during HALO scenarios.
Keywords: in situ simulation, latent safety threats, emergency medicine

LO23

Combating workplace violence in the emergency department - five design themes to improve safety for all

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Introduction: Violence in the Canadian healthcare system has seen an increase in incidents; half of these events occur in emergency departments (ED). The American College of Emergency Physicians states 47% of physicians are affected by ED violence, and the Canadian Association of Emergency Physicians estimates 70% of physicians have observed a rise in ED violence in the past 5 years. The aim of this study was to perform a scoping review of the literature, studying the use of environmental design strategies to reduce the incidence of workplace violence in the ED.
Methods: A NOSM University Librarian assisted search strategy was developed and examined Ovid MEDLINE, Embase, and CINAHL indexes examining studies that used environmental design strategies to reduce the incidence of workplace violence in the ED. Eligible studies were identified using librarian led Boolean phrases which integrated: (a) focus on emergency department; (b) concerned with violence, aggression, or safety; (c) involved environmental, physical, or architectural interventions or policies; (d) published in a peer reviewed journal; (e) used scientific methodology; (f) published within the previous 10 years; and (g) written in English.
Results: Our search returned 153 articles with 11 duplicates. The title and abstract of the remaining 142 articles were screened, and 28 articles met inclusion criteria. These articles were independently assessed by each author, and 10 studies were eligible for analysis and data extraction. Five recurring themes were identified related to improving safety in the ED through environmental design: visibility (6 of the 10 articles), forward flow (5 of the 10 articles), presence of security (7 out of 10 articles), ED access (2 out of 10 articles), and department aesthetics (4 out of 10 articles).
Conclusion: The scoping review of the literature explored environmental design in the ED and its impact on the incidence of violence. Strategies to reduce the incidence of workplace violence in the ED include: unimpaired visibility for staff, eliminating negative progression, patrolling security presence, limiting and controlling ED entry points, and providing a comfortable environment for queued patients and family members. The number of studies found on this topic were limited, and further research is recommended to explore the impact of these strategies, and others, in reducing workplace violence in ED.
Keywords: emergency department design, workplace violence, improving safety

LO24

Validation of the HEARTRISK6 scale for acute heart failure patients managed in the emergency department

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Introduction: Acute heart failure (AHF) is a serious condition commonly seen in the emergency department (ED) where patient outcomes largely depend on prompt treatment and appropriate disposition decisions. The HEARTRISK6 Scale, comprised of 6 clinical variables, was recently developed to assist emergency physicians with disposition decisions by estimating patients' risk of experiencing short-term serious outcomes (SSO). We sought to determine the outcomes of ED AHF patients and assess the predictive accuracy of the HEARTRISK6 Scale.
Methods: We conducted a health records review of 300 consecutive AHF patients presenting to two EDs at a large academic hospital over a 6-months period. Two evaluators abstracted clinical variables, ED management, and patient outcomes, using the hospital electronic records. The HEARTRISK6 score for each patient was calculated based on ED findings: valvular heart disease, heart rate $\geq$ 120 bpm, need for noninvasive ventilation (NIV), creatinine $\geq$ 150 μmol/L, troponin $\geq$ 3x upper reference level, and inability to complete a walk test. The primary outcome measure, SSO, was assessed after ED disposition: mortality, myocardial infarction (MI), intubation, NIV, major cardiac procedure, or return to the ED within 14 days. We calculated sensitivity for classification performance with 95% confidence intervals and potential impact on admission.
Results: Of 529 patients screened, we included 300 with mean age 78.5 years, 51% male, 56.3% arrived by ambulance, and median CTAS score 2. ED treatments included NIV 13.0% and IV nitrates 2.7%. Of the 66.7% admitted to hospital, 29.9% had SSOs: NIV 14.9%, death 8.5%, MI 2.0%. and intubation 1.5%. Those initially discharged had a concerning proportion of SSOs (16.2%). The HEARTRISK6 scores ranged from 0 to 10, where admitted patients had a median score of 3 and discharged patients had a median score of 1. These scores predicted SSO with an area under the curve (c-statistic) of 0.72 (95% CI 0.66–0.78). Using a cutpoint score of $\geq$ 2 as the basis for admission would increase the sensitivity for SSO to 84.0% (75.3–90.6%) from 66.7% without an increase in hospital admissions (63.7%).
Conclusion: There was a high proportion of patients who experienced SSOs, both in those initially admitted and those initially discharged. The HEARTRISK6 Scale showed good predictive accuracy for SSO and can be used to estimate risk and assist physicians in determining which AHF patients should be admitted to hospital.
Keywords: heart failure, emergency department

LO25

Emergency care of adult patients with congenital heart disease: are we prepared? Follow-up of an epidemiological and outcome pilot study

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Introduction: Adult with congenital heart disease (ACHD) are considered a compelling epidemiological priority in the coming years. It has been estimated that, due to the dramatic improvement of acute and post-operative care, a growing number of congenital heart disease patients will achieve adult and even elder range of age. We aim to assess the characteristics, clinical course and outcome of ACHD patients attending the emergency department (ED) of a referral center.
Methods: We retrospectively audited patients who had attended the ED between 1st January 2019 and 31th August 2022. Relevant clinical variables, diagnostic tests performed, final diagnosis and in-hospital outcome were recorded. Events qualifying the long term outcome were death, transplant and readmissions.
Results: Between January 2019 and August 2022, 75 patients, 35 females (47%) attended the ED. Mean age was 40 (±15) years. 35

patients (47 %) had defects of great complexity. 29 patients (39%) were in NYHA class III-IV. 17 patients (23 %) were lost at follow up. Main symptoms were dyspnea 22 (29 %), palpitation 20 (27%), fever 8 (11%), syncope 6 (8%), neurologic symptoms 7 (9.3%), chest pain 5 (7%) and bleeding 3 (4%). Accordingly, 19 patients (25%), 49 (65%), 7 (9%) were assigned to a green, yellow and red triage code respectively. Heart failure and arrhythmia were the most prevalent provisional diagnosis in the ED: 23 (31%) and 20 (27%), respectively. 28 patients (37%) were discharged, one patient died during the observation in the ED, 32 patients (69 %) were admitted to a congenital cardiology ward, 6 (13%) to the intensive care unit, and 8 (17%) to a non-cardiological ward. At a median follow up of 701 (554-984) days, 10 patients (13%) died, 2 (2.6%) were transplanted, 3 (4%) were listed for heart transplant, and 30 (41 %) were re-admitted. At univariate analysis patients with more advance NYHA class, with great complexity anatomy, with pulmonary hypertension and lost at follow-up were more likely to have repeated ED accesses. At multivariate analysis lack of regular follow-up remained the only variable independently associated with multiple ED visits; OR = 14, p = 0.012.

Conclusion: A significant number of patients with CHD underwent repeated ED admission. At long term follow up mortality of patients who had been visited at ED is not negligible. Heart failure and arrhythmia were the most prevalent provisional diagnosis. Being lost at follow up was associated with higher likelihood of hospital admission.

Keywords: adult congenital heart disease, epidemiology, heart failure

LO26

How well do ED physicians comply with the CAEP acute atrial fibrillation checklist for stroke prevention and disposition?

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Introduction: Acute atrial fibrillation/flutter (Acute AF/AFL) is a common emergency department (ED) presentation, with most patients being managed in the ED and discharged home. In 2021, an updated version of CAEP's Acute AF/AFL Best Practices Checklist was published, seeking to guide management. We assessed the compliance and safety of application of the Checklist, with regard to stroke prevention and disposition.

Methods: This study was a health records review including all adults presenting to two tertiary care academic EDs between January and May 2022 with a diagnosis of Acute AF/AFL. Patients were excluded if their initial heart rate was < 100 or if they were admitted to hospital. Data extracted by two reviewers included: demographics, CHADS-65 score, clinical characteristics, ED treatment and disposition, and outpatient prescriptions and referrals. Our primary outcome was the proportion of patient encounters with one or more identified safety issues. Each case was assessed according to seven predetermined criteria from elements of the CAEP Checklist. The research team characterized each criterion as either a moderate or severe safety issue. Each case was assessed and deemed "safe" or to contain a moderate or severe safety issue; discrepancies were resolved by consensus. We used descriptive statistics with 95% confidence intervals.

Results: 222 patients met inclusion criteria. The mean age was 66 years old, 58.1% were male and the mean initial heart rate was 119 bpm. 172 (77.4%) patients were positive for at least one of the CHADS-65 criteria, 116 (52.2%) were not already on anticoagulation and 63 (54.3%) were discharged home with a new prescription for anticoagulation. The primary outcome of safety concern was identified in 7.2% (95% CI 4.2–11.4%) of encounters, representing 18 safety issues in 16 individuals. The thirteen moderate safety concerns included: not recommending follow-up within 7 days for new warfarin or rate control medication (N = 8), and inappropriate prescription of rate or rhythm control medication at discharge (N = 5). The five severe safety concerns were: not prescribing anticoagulation when indicated (N = 4), and incorrect dosing of anticoagulant (N = 1).

Conclusion: Overall, there was a high level of compliance with CAEP's 2021 Acute AF/AFL Best Practices Checklist regarding disposition and stroke prevention. There are opportunities to further improve care with respect to recommendation of anticoagulation and reducing inappropriate prescriptions of rate or rhythm medications.

Keywords: atrial fibrillation, anticoagulation, guidelines

LO27

A prospective randomized pilot trial to reduce readmission for frail elderly patients with acute decompensated heart failure

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Introduction: The frail subset of elderly patients with Acute Decompensated Heart Failure (ADHF) are at higher risk for return emergency department visits and readmissions. Previous research has demonstrated that interventions for reducing ED visits and readmissions that involve multiple domains of patient care are more effective than single interventions alone. The objective of this trial was to evaluate if a multidomain intervention, including improving access to follow-up care appointments, optimizing self-care, and addressing the various cognitive and physical limitations of frailty, would improve quality of life and reduce revisit rates for frail patients with ADHF.

Methods: This was a prospective randomized controlled pilot trial at a tertiary academic hospital. Eligible patients were $\geq$ 70 years old with a Fatigue, Resistance, Ambulation, Illnesses, & Loss of weight (FRAIL) score $\geq$ 3/5 or Clinical Frailty Score (CFS) $\geq$ 5/9, who were discharged with a diagnosis of ADHF. Patients randomized to the intervention arm had a 5-days post-discharge telephone call that confirmed the date, time, and caregiver availability for specialist follow-up appointments. They were also referred for a standardized comprehensive geriatrics assessment. Finally, participants were interviewed to identify modifiable deficiencies in the Self-care of heart failure index, which measures symptom perception, health maintenance behaviours, and self-guided response to new symptoms. Patients randomized to the control group received the standard care for their ADHF after discharge.

Results: 313 patients were screened, with 60 patients enrolled during the study period of 24 months. The study was stopped temporarily during the pandemic because of the reassignment of research staff. Rates of hospital readmission 90 days post-discharge were not statistically or clinically different (control 38.1% vs intervention 40.0%, − 1.9% (CI − 31.8% to 28.0%). Only one death was reported (control arm). Only 53.3% of enrolled patients completed the full study protocol after 1 year.

Conclusion: No clear benefit was seen in this pilot study comparing multiple interventions to reduce ADHF readmissions or ED revisits. Important lessons were learned for future planned RCTs. Further analysis on patient-centred outcomes, self-care index, and quality of life are pending and will provide further insight into the benefits of this type of intervention. (This project was funded by a 2016 CAEP Junior Investigator Award).

Keywords: heart failure, frailty, readmission

LO28

How 'geriatric-friendly' are emergency departments in Newfoundland and Labrador?

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Introduction: As the aging population continues to rise, some emergency departments (EDs) have adapted their approach to this demographic shift. The American College of Emergency Physicians (ACEP) geriatric ED guidelines are internationally recognized and used to modify or improve current models of ED care. The Canadian population is aging at a faster rate in rural areas compared to urban ones. Among provinces, Newfoundland and Labrador (NL)—where $\sim$ 40% of residents live rurally—has the fastest-growing aging population. However, few EDs in NL have geriatric-focused care for older adults $\geq$ 65 years. This study seeks to better understand existing programming for these patients within EDs in NL.
Methods: Data was collected cross-sectionally from Category A ED sites in NL. A 'Category A' site is defined as a site that provides 24/7 ED care with one or more emergency physicians, at least one specialist on-site (i.e., internal medicine, general surgery, pediatrics, etc.), and extended diagnostics. A 28-item questionnaire was administered to one healthcare professional at each site. Respondents then participated in a short interview-based follow-up questionnaire. Descriptive statistics were used to describe quantitative variables. Thematic analysis was used for qualitative variables.
Results: We obtained data from 11 of 12 Category A ED sites in NL. No sites had either a physician (MD) or nurse (RN) with focussed education in geriatric emergency medicine. 64% percent ($n = 7$) reported a social worker in the ED, while only 27% percent ($n = 3$) reported the availability of physiotherapy or occupational therapy in the ED. 73% percent ($n = 8$) of sites reported at least one, often easily implementable, geriatric-specific initiative (i.e., non-slip flooring, large-faced digital clocks, high quality signage, etc.). During follow-up interviews, participants identified lack of awareness, education, infrastructure, staff, and funding as potential barriers in implementing geriatric-friendly ED initiatives.
Conclusion: Our results show a paucity of geriatric-specific initiatives, as well as barriers to implementing such initiatives in EDs in NL. This study underlines the need for better geriatric-friendly care in EDs.
Keywords: geriatrics, emergency, research

LO29

Diagnostic yield of head computed tomography in elderly patients presenting to the emergency department with delirium.

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Introduction: Delirium is frequent in older patients presenting to the emergency department (ED). The investigation and treatment of this pathology are complex and mobilize significant resources, potentially contributing to overcrowding and prolonging the patient's stay in an environment hostile to their condition. This study aims to determine the diagnostic value of head computed tomography (CT) in investigating delirium in the ED and to assess its impact on the patient's care trajectory.
Methods: After the approval by the local ethics committee, the medical records of seniors ($>$ 65 years old) who presented to the ED with acute confusion and then admitted to one of the five hospital centers of the CHU de Québec – Université Laval in 2021 were retrospectively analyzed. Variables of interest (demographic data, investigations, interventions, care trajectory) were collected in a digital database.
Results: During the study period, 273 seniors were admitted with delirium after being assessed in the ED. The average patient age was 83.5 years, and 59.0% were female. In the ED, 90.1% of the patients underwent head CT, and only 4.1% of the advanced imaging showed acute abnormalities that could explain delirium. Among these positive examinations, stroke and subarachnoid hemorrhage were the most common findings. The length of stay (LOS) in the ED was significantly longer for patients undergoing head CT (34.1 vs 23.9 h, $p < 0.05$). However, the LOS for hospitalized patients who underwent head CT while they were investigated in the ED was not different (526 vs 347 h, $p = 0.07$).
Conclusion: The use of cerebral CT in investigating delirium in the elderly is frequent and is associated with a longer LOS in the ED. However, this test rarely determines the cause of delirium in our population. Further studies may allow the development of a clinical decision rule to increase the diagnostic yield of head CT in assessing the elderly with delirium.
Keywords: delirium, confusion, computed tomography

LO30

Pharmacological management of agitation and delirium in older adults: a survey of practices in Canadian emergency departments

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Introduction: Hyperactive delirium is a common presenting symptom for older adults in the emergency department (ED). No medications have been found to reduce delirium severity, symptoms, or mortality, yet they may cause harm. Guidelines suggest using medications only when patients are posing a risk of harm, situations which may arise frequently in the ED. We sought to characterize prescribing patterns of medications for agitation by ED physicians in Canadian hospitals.
Methods: In this multicentre study, we surveyed physicians in Vancouver, Toronto, and Quebec. Descriptive statistics were used to summarize group characteristics and starting doses were compared to order sets. Fisher exact tests were used for demographic comparison. Ordinal linear regression models were run to identify a relationship between starting dose of medications and location.
Results: Of the 137 physicians invited, 77 (56%) completed the survey. Use of order sets was greatest in Sherbrooke and least in Vancouver. The most common medications used across sites were haloperidol, lorazepam, and quetiapine. Benzodiazepines were used across all sites but were used significantly more frequently in Vancouver than the other sites. Practice location was a significant predictor of starting dose of haloperidol, with Sherbrooke and Toronto having a lower starting dose than Vancouver.
Conclusion: Higher use of order sets correlated with lower and more consistent starting doses. Benzodiazepines are used across EDs in Canada despite little evidence for efficacy in delirium and risk of harm. Implementation of order sets may be a useful way to standardize ED management of older adults experiencing hyperactive delirium.
Keywords: hyperactive delirium, geriatrics, antipsychotics

LO31

Development and validation of a machine learning model for predicting early subsequent stroke in emergency department patients with transient ischemic attack

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Introduction: Emergency department (ED) patients presenting with transient ischemic attack (TIA) are at risk of developing subsequent stroke. Machine learning (ML) has performed well in other prognostic applications. Our objectives were to: (1) develop a ML model for predicting subsequent stroke or carotid endarterectomy within 7 days in patients presenting to ED with TIA and (2) compare ML performance to clinical risk scores.
Methods: Prospective data of adult ED patients diagnosed with TIA were collected from 13 centres from October 31, 2012–May 30, 2017. We used a time-based split on August 1, 2014 to divide into derivation and validation sets in a 1:3 ratio. Primary outcome of subsequent stroke or carotid endarterectomy within 7 days of TIA diagnosis was determined by a blinded adjudication committee of stroke neurologists. We derived two supervised ML models using L1/Lasso or L2/Ridge regularized logistic regression (LR) using up to 47 variables composed of routine clinical assessment data including history of presenting event, physical exam, demographics, medical history, and medications. We defined low and high-risk cut-offs at sensitivity 98% and specificity 90% respectively for the ML models and in accordance to prior validation studies for the clinical risk scores. We adhered to TRIPOD reporting guidelines.
Results: The primary outcome occurred in 182/7608 (2.4%) total patients; 55/2540 (2.2%) in the derivation cohort and 127/5068 (2.5%) in the validation cohort. In the derivation, area under receiver-operating characteristic curve (AUC) for the LR-L1 and LR-L2 models was 0.863 and 0.867, respectively. In the validation, ML models (LR-L1 AUC 0.770; LR-L2 AUC 0.773) had better discrimination than Canadian TIA Score (CTS) (0.690), ABCD2 (0.620), and ABCD2i (0.637). DeLong test found significant differences in AUC between all pairs except LR-L1 and LR-L2, and ABCD2 and ABCD2i. Risk-stratification analysis showed LR-L1 and LR-L2 had comparable sensitivity (0.94, 0.95) and specificity (0.89, 0.89) to CTS (sensitivity 0.96, specificity 0.89; $p > 0.45$ in all comparisons) and lower specificity than ABCD2 and ABCD2i (0.92 and 0.96 respectively; $p < 0.005$ in all comparisons).
Conclusion: Our ML models use routinely collected clinical data to more accurately determine which ED patients with TIA will develop early subsequent stroke or require carotid endarterectomy within 7 days of index visit compared with current clinical risk scores, and have comparable ability to risk stratify to inform ED management.
Keywords: TIA, machine learning, stroke

LO32

Detecting unrecognized ED delirium using electroencephalography (EEG) functional connectivity measures: a systematic review

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Introduction: Unrecognized delirium in the Emergency Department (ED) remains common (50–75%) despite a threefold mortality increase for those discharged home. Current models posit that delirium may manifest as abnormal brain functional connectivity. Scalp recording of electrocerebral activity may offer a non-invasive means to assess functional connectivity which could be used to detect delirium in the ED.
Objective: To review the use of EEG-based functional connectivity measures in the detection of delirium and to determine the feasibility of using EEG in the ED.
Methods: Medline, PubMed, PsychInfo, Embase and CINAHL were searched for relevant articles containing original data studying EEG functional connectivity measures in delirium. Studies involving evoked potentials and transcranial magnetic stimulation were excluded. EEG studies not measuring functional connectivity were excluded. Studies of other altered levels of consciousness besides delirium were excluded. PRISMA guidelines were followed.
Results: The search yielded 1030 studies. Following deduplication, two reviewers screened 922 articles to determine relevancy. 195 full-text studies were assessed for eligibility. 4 full-text studies were included in the review. The studies used a variety of EEG measures including phase lag index, coherence, entropy, shortest path length, minimum spanning tree and network clustering coefficients to determine functional connectivity. Across all connectivity measures, delirium was associated with decreased brain functional connectivity. Specifically, all four studies found a decrease in alpha band connectivity for patients with delirium. Changes in connectivity were generally global in nature. Of the four studies, one study enrolled ED patients. One study employed a portable EEG device and measured connectivity in delirious patients using only three electrodes. This suggests that it may be feasible to assess functional connectivity with portable EEG in patients with delirium.
Conclusion: Delirium was consistently associated with decreased EEG measures of brain functional connectivity. One study was able to use EEG to study delirium in the ED. While it is evident that EEG-based spectral analysis can be used to study delirium in a variety of settings, further feasibility studies are needed to determine if portable EEG can be used to help detect delirium in ED patients
Keywords: delirium, geriatrics, emergency

LO33

Data resuscitation – extracting machine-readable information from a million paper runsheets using computer vision and human ingenuity

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Introduction: Traditionally, paramedics documented clinical information on paper "runsheets." Some services continue to use paper, while others that have transitioned to electronic patient-care reports have large archives that are not machine-readable. The result is the effective loss of data invaluable for research and quality improvement, especially to assess temporal changes. In the case of one large urban EMS system in North America, 1,031,346 scanned runsheets have been archived for the 2015-2020 period, of which only 20% have been processed by human abstractors. Processing the remaining files would require 7.8 person-years at a cost of $230,000. There has been no known published research describing automatic data extraction from EMS archives.
Objective: To describe the process and estimate the cost and accuracy of extracting vital signs and clinical interventions from digital images of runsheets using machine-learning (ML).
Methods: After each scan was aligned to a baseline image using computer-vision algorithms, the sections showing vitals signs (25 freehand boxes and 65 checkboxes) and paramedical interventions (51 checkboxes) were cropped out. We manually labeled the checkbox images for 1000 random runsheets, and used a human-in-the-loop

strategy to label the vital sign images. Using 80% of the human-labeled data, we fit a multi-label convolutional neural network (CNN) to the possible recorded values for each of the vital signs, and one single-label CNN for checkboxes. We used the remaining 20% of data to measure accuracy.
Results: The project was completed in four months at a cost of $29,000. Image preparation took 24 h of computation, while fitting each model took 5.5 h. Excluding empty boxes (nearly always correctly classified), the extraction of handwritten vital signs had an accuracy of 95–98% depending on the vital sign, and 99% accuracy for the checkboxes.
Conclusion: It is feasible to efficiently and accurately extract machine-readable data from handwritten numbers and checkboxes from paper-based runsheets. The process did not require specialized hardware, but did require expertise in ML and in EMS data collection. The project did not include other parts of the runsheet, such as chief complaint, which will be the focus of future research.
Keywords: machine learning, computer vision, data processing

LO34

Evaluating the impact of a specialized and centralized online medical consultation system for paramedics

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Introduction: In Eastern Ontario, prehospital consultation calls are answered by on-duty Emergency Department (ED) physicians. Calls interrupt care for critically ill ED patients, and often require doffing of personal protective equipment. To support the expanding scope of paramedic practice and increased need for online consultation, we sought to determine the impact of an Online Medical Consultation (OMC) program staffed by dedicated Prehospital and Transport Medicine (PTM) physicians on system-relevant performance.
Methods: Ottawa and Kingston EDs provide clinical consultation for nine paramedic services in Eastern Ontario. The OMC program was implemented in Ottawa (in July 2020). Sites were compared to their pre-implementation period (before-after design) and to each other (concurrent control). Eligible consecutive cases were reviewed from a central database of digital voice recordings. We collected paramedic, ED physician, and system characteristics. We used a standardized-piloted data collection tool to determine call duration, number of contraindicated orders, orders outside paramedic scope of practice, and call delays. We present descriptive statistics and group comparisons using t-test and Fisher's exact test.
Results: We reviewed 220 paramedic consultation calls (55 pre- and post-implementation at each site). Patient median age was 60; base hospital physicians were 78.2% FRCP/16.4% residents in Ottawa vs. 79.1% FRCP/46.4% residents in Kingston. Most calls (70.5%) were for mandatory consults and 22.7% were voluntary. The majority were related to cardiac arrest (43.6%), combative patients (15.0%), and analgesia (13.6%). Before-after comparisons were: for mean call duration in Ottawa (from 4:28 to 4:05 min $p = 0.77$) and Kingston (from 4:50 to 4:13 min $p = 0.49$), for calls with orders contradicting a medical directive in Ottawa (from 10.9% to 7.27% $p = 0.51$) and Kingston (from 1.8% to 9.1% $p = 0.21$), for orders outside of paramedic scope in Ottawa (from 1.8% to 0.0%) and Kingston (from 1.8% to 1.8% $p = 1.00$), and for ED physician interruptions in Ottawa (from 10.9% to 0.0%) and Kingston (from 7.3 to 5.5% $p = 1.00$). "After" group comparisons between Ottawa and Kingston (control) were not statistically different.
Conclusion: The OMC program decreased the burden for on-duty physicians and physician interruptions in Ottawa. There were additional time intervals and adherence to protocol benefits which couldn't be statistically confirmed without a much larger sample size.
Keywords: prehospital, online medical direction, paramedic patch system

LO35

Initial vital signs as predictors of morbidity and mortality in undifferentiated emergency department hypotensive patients - a multicentre study.

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Introduction: Patients presenting to the emergency department (ED) with undifferentiated hypotension are at high risk of organ failure and death. While the use of initial vitals and early warning scores have been used in risk stratification in inpatient settings, we wanted to explore if ED vital signs can predict ICU admission and death in undifferentiated hypotensive patients.
Methods: In this secondary analysis of prospectively collected data from the SHoC-ED database, we investigated the predictive ability of initial heart rate (HR), systolic blood pressure (SBP), respiratory rate (RR), temperature, shock index (SI), alert/verbal/pain/unresponsive (AVPU) score or modified early warning score (MEWS) for ICU admission or 7-day mortality in undifferentiated hypotensive patients presenting to the ED. Data from 269 patients at six sites (three North American, three South African) was used for univariate logistic regression with 10x cross validation. Contingency tables were used to determine sensitivity, specificity, positive predictive value, negative predictive value, and likelihood ratios for a composite variable comprising ICU admission and mortality.
Results: Other than for AVPU, traditional vital signs (temperature, SBP, HR and RR) demonstrated poor sensitivities in predicting ICU admission and death. Specificity for SBP was 85.5% and below 85% for HR, RR and temperature. Sensitivity and specificity were 17.5% and 76.4% respectively for SI (< 0.9); 39.4% and 83.9% for MEWS; and 87.5% and 81.4% for AVPU. AVPU also had a negative predictive value of 99% and a positive likelihood ratio of 4.7. A composite SIAVPU variable was poorly sensitive ($\sim$23%) yet specific ($> 82\%$) when tested at ≥ 0.90, ≥ 0.82, and ≥ 0.80 cut-offs, while ≥ 0.82 had the highest positive and negative likelihood ratios of 1.98 and 0.866, respectively.
The only vitals to be deemed significantly ($p < 0.05$) associated with ICU admission were systolic blood pressure (Coeff: -0.0643), heart rate (-0.0142), and SIAVPU (0.3800). Systolic blood pressure (-0.0377), shock index (1.68), respiratory rate (0.0634), AVPU score (4.34), and SIAVPU score (1.09) were all significantly associated with mortality.
Conclusion: Traditional ED vitals were generally poor predictors of ICU admission and death in undifferentiated hypotensive ED patients. Combination variables such as SI, MEWS and AVPU had better specificities with AVPU demonstrating the best sensitivity, specificity, and positive likelihood ratio.
Keywords: vitals, shock, risk stratification

LO36

Economic evaluation of a strategy empowering paramedics to assess low-risk trauma patients using the Canadian c-spine rule and selectively transport patients without immobilization

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Introduction: We recently demonstrated that paramedics from multiple communities could safely assess low-risk trauma patients using the Canadian C-Spine Rule (CCR) and selectively transport patients without immobilization and with significantly less pain and discomfort. We now seek to evaluate the cost-effectiveness of implementing the CCR in the prehospital field.
Methods: We conducted a cost-utility analysis based on data obtained from a 9-months pragmatic, stepped-wedge cluster randomized trial evaluating the CCR, Ontario health administrative data, and the published literature. The trial took place in 11 Ontario communities, during which randomized sites crossed in 3 sequences from the control (usual care) to the intervention (CCR implementation) at 3-month intervals. We used a decision tree model to simulate total costs and outcomes of CCR and usual care over 30 days from date of randomization. Total costs included intervention costs (training, consumable equipment, and personnel time), and costs associated with health care utilization. Outcomes were quality-adjusted life days, and proportion of patients with a high pain score or level of discomfort (defined as ≥ 5 on a 10-point Likert scale). A series of sensitivity analyses were performed to assess the robustness of study findings.
Results: In total, 3646 patients were evaluated: mean age 47 years [range 16-103 years], female 51.4%, MVC 53.2%, fall 30.4%, transported to hospital 93.5%, mean overall pain (4.9/10; SD 3.0) and discomfort (5.6/10; SD 2.9), acute c-spine fracture/dislocation 8.9%, and required stabilization 1.2%. The proportion of patients transported with immobilization were 1334/1740 (76.7%) in the control and 813/1885 (43.1%) in the intervention periods. Paramedic use of the CCR resulted in a lower proportion of patients experiencing substantial pain (64.8% vs. 71.5%) and feeling uncomfortable (67.2% vs. 77.2%). CCR was the dominant intervention compared to usual care as it resulted in lower costs (C$4,494 vs. C$4,761; -C$267, 95%CI -C$699 to C$203) and slightly improved quality-adjusted life days (23.107 vs. 23.103) over 30 days. The cost-effectiveness findings were robust to changes in model parameters and assumptions. Given no spinal cord injury, C$1million/year could be saved by implementing this strategy among the 11 participating communities alone.
Conclusion: The use of the CCR by paramedics was cost-effective given that the strategy resulted in better patient outcomes at lower costs compared to usual care.
Keywords: c-spine rule, prehospital, cost analysis

LO37

Clinical roles in the medical communications centre: a rapid scoping review by the prehospital evidence based practice program

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Introduction: In recent years 911 call volumes have increased, and Emergency Medical Services (EMS) are commonly stretched beyond capacity. To better match resources with patient needs, some EMS systems have integrated clinician roles into the emergency medical communications centre (MCC).
Methods: Using a rapid scoping review methodology, we searched PubMed for studies reporting any clinical role employed within an emergency MCC. We accepted reviews, experimental and observational designs, as well as expert opinion. Studies reporting on dispatcher recognition and pre-arrival instructions were excluded. Title and abstract screening were conducted by a single reviewer, included studies were verified by two reviewers and data extraction was completed in duplicate, all within Covidence review software. Level of evidence was assessed using the prehospital evidence-based practice (PEP) scale. The protocol was registered in Open Science Framework (10.17605/OSF.IO/NX4T8). Our objective was to explore the nature and scope of clinical roles in emergency MCCs.
Results: Our search yielded 1071 titles, 4 were added from other sources, 44 studies were reviewed at full text stage and 31 were included. The included studies were published from 2002-2022 and represent 18 countries. Studies meeting inclusion criteria consisted of level I (n = 1, 3%), II (n = 12, 39%), and III (n = 5, 16%) methodologies, as well as thirteen other studies (42%) with qualitative or other designs. Most of the included studies report systems that employ nurses in the MCC (n = 27, 87%). Thirteen (42%) studies reported on the inclusion of paramedics in the MCC, and four (13%) reported physician involvement. The roles of these clinicians chiefly consisted of triage (n = 26, 84%), advice (n = 15, 48%), referral to non-emergency care (n = 12, 38%) and peer-to peer consulting (n = 2, 6%). Alternative dispositions (as opposed to emergency ambulance transport) for low acuity callers included self-care, as well as referral to general practitioner, pharmacist, or other outreach programs.
Conclusion: There is a range of literature reporting on clinical roles integrated within MCCs. MCC nurses, physicians, and paramedics have assisted with triage, advice, and referrals to better match resources to patient needs, with or without the requirement for ambulance dispatch.
Keywords: clinical support line, medical communications centre, secondary triage

LO38

The clinical history of medical 9-1-1 calls

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Introduction: Due to the difficulty of linking patient-level data across prehospital and hospital care, we have a limited knowledge of the trajectory of patients seeking medical help through 9-1-1. This knowledge gap inhibits an understanding of the relationship between call-taking, paramedical interventions, and post-transport outcomes, which is critical for system planning.
Objective: To describe the trajectory of patients from 9-1-1 call-taking to outcomes.
Methods: Descriptive analyses of calls to 9-1-1 from a large urban EMS system that uses the Medical Priority Dispatch System (MPDS). The study cohort included all 9-1-1 calls for adult patients from 2018 to 2021 with sufficient information to link to outcome. The dataset included measures of call-taking (MPDS complaint and determinant), patient acuity (Critical Illness Prediction score [CIP]; time-dependent paramedic intervention), and post-transport outcomes (ICU admission; 30-day survival).
Results: A total of 321,170 adult calls were received during the study period, with 272,122 (85%) meeting inclusion. Complaints ranged from 0.01% (Electrocution) to 13.6% (Falls), with 32.2% of calls

determined as high-priority (Delta/Echo) and 67.8% as low-priority (Omega/Alpha/Bravo/Charlie). One percent of patients had CIP scores suggesting high-risk of critical illness (4 to 8); 5.8% of patients received at least one time-dependent paramedic intervention. The ICU admission rate was 2.8%, and 5.1% of patients died within 30 days of their 9-1-1 call. The two most common trajectories were a low- or high-priority 9-1-1 call for a patient with low-risk of critical illness who received no time-dependent paramedic interventions, was not admitted to the hospital, and did not die within 30 days of discharge (45.9% for low-priority; 18.5% for high-priority). Calls receiving a high-priority dispatch for a patient with high-risk of critical illness who received a time-dependent paramedic intervention before being admitted to the ICU were extremely rare (0.07%).
Conclusion: We observed a broad range of trajectories with the most common describing a clinically stable patient not requiring emergent prehospital or ICU care. These results support the development of initiatives designed to preserve emergency resources for critically ill patients and orient others to alternative care.
Keywords: prehospital, trajectory of care, patient outcome

LO39

A systematic review of sufentanil use in the management of adults with acute pain in the emergency department and pre-hospital setting

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Introduction: Pain is commonly encountered in the Emergency Department (ED) and pre-hospital setting and often requires opioid analgesia. We sought to synthesize the available evidence on the effectiveness of sufentanil for acute pain relief for adult patients in the pre-hospital or ED setting.
Methods: This systematic review was conducted in accordance with PRISMA guidelines. Medline, Embase, Cochrane CENTRAL, and CINAHL were searched from inception to February 1, 2022. The grey literature was also searched. We included randomized controlled trials of adult patients with acute pain who were treated with sufentanil. Two reviewers independently completed screening, full text review, and data extraction. Primary outcome was reduction in pain. Secondary outcomes included adverse events, need for rescue analgesia, and patient and provider satisfaction. Risk of bias was assessed using the Cochrane Risk of Bias 2 tool. A meta-analysis was not performed due to heterogeneity.
Results: Of 1120 unique citations, four studies (3 ED and 1 pre-hospital) met full inclusion criteria ($n = 467$ participants). The overall quality of the included studies was high. Intranasal (IN) sufentanil was superior to placebo for pain relief at 30 minutes (difference 20.8%, 95% CI 4.0–36.2%, $p = 0.01$). Both IN (two studies) and IV sufentnail (one study) were non-inferior to IV morphine. Mild adverse events were common and there was a higher propensity for minor sedation in patients receiving sufentanil. There were no serious adverse events requiring advanced interventions.
Conclusion: Sufentanil was not inferior to IV morphine and was superior to placebo for rapid relief of acute pain in the ED and pre-hospital setting. The safety profile of sufentanil is similar to IV morphine in this setting, with low concern for serious adverse events, although larger studies are required to confirm safety. Finally, the IN formulation provides an alternative, rapid route that may benefit the unique ED and pre-hospital patient population.
Keywords: sufentanil, systematic review

LO40

Nitrous oxide use for children experiencing painful procedures: a survey of Canadian pediatric emergency physicians' knowledge, attitudes, and practices

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Introduction: Many children who visit the emergency department (ED) undergo painful or distressing procedures for investigation and treatment. Nitrous oxide (N_2O) is an inhaled analgesic/ anxiolytic with ample evidence supporting its safety and efficacy. Despite it being included in national guidelines on the management of distressing procedures in children, the prevalence of N_2O use remains low and its indications in pediatric EDs across Canada remain unknown. Our objectives were to gain an understanding of the knowledge, attitudes, and practice patterns of Canadian physicians pertaining to N_2O use, as well as to obtain information about site-specific N_2O protocols.
Methods: An electronic survey was distributed to all physician members of Pediatric Emergency Research Canada (PERC) from February to April 2021. Survey items addressed access to N_2O, knowledge and comfort around N_2O use, and any perceived barriers/facilitators. In addition, the 15 Canadian EDs that are affiliated with PERC were contacted individually to understand their specific departmental N_2O procedures, including equipment, personnel, and any systemic barriers/facilitators.
Results: Site leads from all 15 PERC EDs were contacted. 40.0% (6/15) of sites had N_2O available and 83.3% (5/6) of these had written policies in place. The response rate for the individual physician survey was 67.8% (156/230), with 53.2% (83/156) women; mean clinical experience was 14.7 years (SD 8.6). 48.7% (76/156) of physicians reported using N_2O in their clinical practice. The most common indications for use were fracture/ dislocation reduction (69.7%, 53/76), wound closure (60.5%, 46/76), and abscess incision & drainage (59.2%, 45/76). The most common perceived barriers to N_2O use included ventilation concerns (71.2%, 57/80) and unfamiliarity with equipment (52.5%, 42/80). The most common perceived facilitators were N_2O availability (73.0%, 114/156) and clinical experience (71.7%, 112/156). Of the 51.3% (80/156) physicians who did not use N_2O, 93.7% (75/80) did not have access at their site; notably, the majority of them (77.3%, 58/75) indicated a desire to have access to N_2O.
Conclusion: Despite evidence to support its use, only half of Canadian pediatric emergency physicians currently use N_2O as a tool for treating procedure-related pain and distress. Increasing the availability of equipment, protocols, and clinical training for N_2O may standardize the ability for clinicians to better manage children's acute pain and distress in the ED.
Keywords: nitrous oxide, anxiolysis, pediatric pain

LO41

Effectiveness of prescribed opioids for acute pain management after emergency department discharge: a systematic review and meta-analysis

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Introduction: Opioids are often prescribed to emergency department (ED) discharge patients for acute pain, their short-term effectiveness and side effects after the ED stay has rarely been evaluated. The purpose of this study was to synthesize the evidence regarding the effectiveness of opioids versus non-opioid alternatives for the home management of acute pain in ED discharged patients.
Methods: MEDLINE, EMBASE, CINAHL, PsycINFO, CENTRAL, and gray literature databases were searched from inception to May 2022. Two independent reviewers selected randomized controlled trials examining the effectiveness of opioids prescribed to ED discharged patients, using first only the title and abstract, then the full text. Data were extracted independently by two reviewers who also assessed the risk of bias. The primary outcome was the difference in pain intensity scores or pain relief. Secondary outcomes were the percentage of patients with adverse events. All meta-analyses used random-effect models and heterogeneity was quantified using I^2, Tau^2 and Cochran's Q tests.
Results: From the 5419 initially screened citations, 46 full texts were evaluated and six studies on 1,459 patients met inclusion criteria. Risk of bias was low for five studies. There was no statistically significant difference in pain intensity scores or pain relief between prescribed opioids versus non-opioid (standardized mean difference [SMD], 0.12; 95% CI, − 0.10 to 0.34). In a sensitivity analysis, excluding adults, results were similar for the pediatric population (2 studies) (SMD, − 0.07; 95% CI, − 0.55 to 0.42). In another sensitivity analysis excluding studies with codeine, opioids were more effective than non-opioids (SMD, 0.30; 95% CI, 0.15 to 0.45). However, there were more adverse events associated with opioids (odds ratio, 2.62; 95% CI, 2.03 to 3.39).
Conclusion: This systematic review and meta-analysis showed that for ED discharged patients, opioids in general are not more effective than other non-opioid treatments and are associated with more adverse events. However, this absence of effectiveness seems to be driven by codeine, as other opioids are more effective than non-opioids. Further prospective studies on the effectiveness of short-term opioid use after ED discharge, excluding codeine, their adverse events and potential misuse are needed.
Keywords: opioids, acute pain

LO42

Is there a link between assessor personality traits and assessor stringency?

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Introduction: Assessor stringency/leniency (ASL)—an assessor's tendency to award low or high scores—has repeatedly been shown to have significant impacts on learner scores, and is constant over time within a given assessor. Underlying drivers of ASL are unknown and some authors have proposed that it may be tied to personality traits, but research in this area has been limited. We sought to explore a possible relationship between assessor personality traits and ASL.
Methods: This study was conducted in the emergency department of 2 teaching hospitals in Ottawa, Canada. All full-time emergency physicians (EPs) were invited to complete a validated personality questionnaire—the IPIP-NEO-120—which generates a percentile score for each of five personality traits. Separately, all end-of-shift assessments completed between July 1, 2021 and June 30, 2022 were collected, and ASL was quantified for each assessor using the previously developed mean-delta method (in brief, the mean difference between the scores an assessor awards to learners and those learners' average scores is calculated for each assessor). Finally, we evaluated the relationship between ASL and personality traits using linear regression.
Results: There were 184 learners, with a total of 2127 completed assessments during the study period. Twenty-five EPs (out of a possible 69 full-time EPs) completed the personality questionnaire, and there was a wide distribution of percentiles for each personality trait. ASL was approximately normally distributed for the population of all EPs, as well as those EPs who completed the questionnaire.
There was a trend towards a relationship between ASL and extraversion ($p = 0.0721$, $R^2 = 0.134$) but this was non-significant. There was no meaningful relationship between any of the other personality traits and ASL.
Conclusion: We found no significant relationship between assessor personality traits and ASL, and conclude that it is unlikely that personality traits are an educationally important determinant of ASL.
Keywords: assessor stringency/leniency, assessor personality

LO43

The future of frostbite care in Canada: exploring the development of a Canadian frostbite care network

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Introduction: Frostbite is a cold-weather tissue injury with potential for severe functional consequences. Increasing homelessness, as well as increased participation in adventure sports continue to heighten frostbite presentations in urban and rural environments. While Canada's geography bodes leadership in frostbite care, approaches are geographically fragmented due to variance in medication and equipment access, limited local patient numbers, and isolated faculty expertise. This study serves to inform the development of a Canadian Frostbite Care Network (CFCN) to improve patient outcomes.
Methods: Semi-structured telephone interviews ($n = 21$) were conducted with physicians and pharmacists involved in frostbite care from rural to tertiary-care settings in 11 provinces and territories. Interviews explored case volume, protocols for assessment and management, and value of a CFCN. Following this, focus groups were held ($n = 43$) with health professionals experienced in managing frostbite. All participants were recruited via purposeful and snowball sampling. Groups explored possible roles of a CFCN using topics identified from interviews, including current challenges and opportunities in frostbite management and research. Data was triangulated amongst focus groups and interviews. Using grounded theory and Braun and Clarke (2006) six-step thematic analysis, four independent researchers analyzed transcripts to generate roles and priorities for a CFCN. Authors reviewed emerging themes to draw interpretations from the study findings.
Results: Interview results demonstrated trends towards formal prognostic grading systems and order sets. Few institutions had access to nuclear imaging and angiography for prognostication. Management approaches varied in rapid rewarming protocols, use of prophylactic antibiotics, and vasodilator/thrombolytic use, but were largely consistent in NSAID, and pain management use. Respondents argued a need for improvement in care (94%) and were supportive of standardized treatment protocols (100%). Focus group results revealed five key priorities for the CFCN (1) Facilitating the research process, (2) Educating stakeholders, (3) Facilitating collaboration, (4) Optimizing frostbite care, and (5) Advocacy for frostbite care in Canada.

Conclusion: Timely frostbite recognition and management is critical to Canadian emergency physicians. The establishment of a CFCN may address the need for improved patient care outcomes and key priorities of frostbite research, education, and advocacy.
Keywords: frostbite network, frostbite management, frostbite education

LO44

Predictors of 30-day recurrent emergency department visits for hyperglycemia in patients with diabetes: a population-based cohort study

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Introduction: Diabetes is one of the most prevalent chronic diseases among emergency department (ED) visitors, and patients with poorly controlled diabetes often present with hyperglycemic episodes. Few population-level studies have investigated the healthcare burden of ED visits for hyperglycemia. The objectives of this study were to describe patients with diabetes presenting with their first ED visit for hyperglycemia and to identify predictors of recurrent ED hyperglycemia visits.
Methods: Using linked ICES databases, we conducted a population-based cohort study of adult and pediatric patients with types 1 and 2 diabetes with a first ED visit for hyperglycemia from April 2010-March 2020 in Ontario. We determined the proportion of patients with a recurrent ED visit for hyperglycemia within 30 days of the index visit. Using multivariable regression analysis, we examined clinical and socioeconomic predictors for recurrent visits. Subgroup analysis was also performed for patients aged less than 18 years, 18-65 years, as well as greater than 65 years.
Results: 779,632 patients presented with a first ED visit for hyperglycemia in the study period. Mean (SD) age was 64.3 (15.2) years; 47.7% were female. 11.0% had a recurrent 30-day ED visit for hyperglycemia. Statistically significant predictors of a recurrent visit included: male sex, type 1 diabetes, less ethnic diversity, more deprivation, higher hemoglobin A1C, more family physician or internist visits within the past year, being rostered to a family physician, ED visits in the past year, ED or hospitalization within the previous 14 days, access to homecare services, and hyperglycemia encounters in the past 5 years. Alcoholism and depression or anxiety were predictors for the 18-65 age subgroup.
Conclusion: This population-level study demonstrates the high burden of ED hyperglycemia visits in Ontario. Predictors of recurrent visits for hyperglycemia may be used to develop targeted interventions to improve patient outcomes and reduce healthcare system costs.
Keywords: hyperglycemia, recurrent visits, population-based cohort

LO45

Examining emergency residents' experience of being a near-peer mentor and uncovering its effect on perceived wellness

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Introduction: In 2021, the University of Ottawa Department of Emergency Medicine (DEM) implemented a near-peer support program matching junior resident-mentors to student-mentees. This study explored DEM residents' perceptions of the near-peer program and whether they find the initiative beneficial in strengthening their resilience.
Methods: In summer 2022, 5 resident-mentors participated in semistructured interviews to discuss their experiences of being a mentor and their perceptions of the near-peer project, the COVID19 pandemic and wellness initiatives. Themes were generated using constant comparative analysis and reflexive thematic analysis.
Results: 14 student-mentees and 7 resident-mentors participated in the program. Majority of mentees were Year 2 students (11/14); majority of mentors were PGY2 residents (6/7). 5 out of 7 resident-mentors participated in semistructured interviews. Themes included the role of reflection on burnout, motivation and satisfaction with being a mentor, and negative effect of the pandemic on their training and wellbeing. Participants found self-reflection to be protective, as they felt their wellness increased as they reflected on their journey to residency through this near-peer program. Giving back was identified as the primary motivator for participating, as they felt a need to pay forward the mentorship they received as students. Participants saw social isolation as the key factor causing burnout and was the most negative effect from the COVID19 pandemic.
Conclusion: While there is a role for wellness initiatives that target individual residents, more salient is engagement on a systemic level. We examined resident-mentors' experiences in near-peer mentoring in relation to their wellness during the COVID-19 pandemic and uncovered overarching perceived benefits of being a near-peer mentor, via self-reflection, sense of purpose and giving back, and meaningful social engagement.
Keywords: wellness, mentorship, near-peer

LO46

Observing from afar: continuous pulse oximetry for people who smoke opioids to prevent overdose deaths

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Introduction: Smoking is the most common mode of drug consumption in BC, including among overdose decedents (44% of deaths in 2021). Misperceptions of overdose risk and lack of smoking-specific harm reduction services contribute. Overdose prevention services (OPS) allow clients to use drugs in observed settings. OPS use declined at COVID-19 onset, especially for smoking. Continuous pulse oximetry (CPO), common in acute care, allows real-time, remote oxygen saturation monitoring. Our objective was to evaluate the feasibility, acceptability, and effectiveness of a novel CPO protocol at OPS for people who smoke opioids.
Methods: We developed a CPO protocol for use at OPS in collaboration with experts in emergency medicine, public health, people with lived experience of substance use, and OPS staff. We implemented it from March-August 2021 at four OPS in BC with smoking facilities. We included adults presenting to smoke opioids. Peer researchers conducted structured observations during participant monitoring and collected information on demographics, co-morbidities, substance use history, reasons for smoking opioids, and perceived risks. Peer researchers administered post-monitoring surveys to participants, themselves, and OPS staff.

We summarized descriptive statistics based on variable type. We qualitatively analyzed survey responses using a thematic deductive process and validated themes with peer researchers.
Results: We included 599 observed smoking events. We obtained 599, 511, and 19 surveys from participants, peer researchers, and OPS staff. Among participants, 73% were male with mean age 38.5 years (SD 11.6). Regarding reported opioid use patterns: 98% used heroin,

"down," or fentanyl; 63% concurrently used other substances (32% used stimulants); 76% had smoked alone in the last three days; and 36% had ever overdosed while smoking.
The majority of participants (93%) and OPS staff (94%) reported that CPO equipment was easy to use, and they would use it again. Most participants (94%), peer researchers (94%), and OPS staff (90%) reported high satisfaction. CPO improved OPS staff confidence (*"provides a level of certainty"*) and improved participants' sense of safety (*"save lives"*; *"made them feel seen"*). They also noted that CPO allowed for physical distancing.
Conclusion: Our study demonstrates that CPO is feasible, acceptable, and effective at enabling safe monitoring of people who smoke opioids at OPS. Expansion to other sites and settings should be explored.
Keywords: opioid-related disorders, opiate overdose, oximetry

LO47

Deliberate practice makes perfect: differentiating abusive versus accidental burn and bruise injuries in children

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Innovation Concept: Prior literature has demonstrated that front-line physicians have limited ability to differentiate abusive from accidental injuries in children; however, there is no evidence examining clinicians' ability in this skill in children presenting with burn or bruise injuries. Our goal was to design a web-based education intervention grounded in education theory that teaches front-line physicians to identify burn and bruise injuries suspicious for abuse and to determine physician reaction and skill (Kirkpatrick levels 1 and 2).
Methods: A convenience sample of front-line physicians in Canada and the USA deliberately practiced 300 cognitively simulated image-based cases of ethnically diverse children with bruise and burn injuries (https://drive.google.com/file/d/1j5tKsNgOjzOYXpHGu1uVmslN5qMVv3Cl/view). They were asked if suspicion for abuse was present or absent, and feedback was provided after every case. Par ticipants were provided with their diagnostic accuracy, sensitivity, and specificity. Participants also completed a 7-question evaluation (learning objectives, skill transferable to practice, enhanced my knowledge, relevant to my practice, my expectations, and recommend to a colleague), with responses ranked as poor (1); needs work (2); meets expectations (3); above expectations (4); outstanding (5).
Curriculum, Tool or Material: Of the 93 physicians who completed the cases, 75 (80.6%) also completed an evaluation. Participants had an initial diagnostic accuracy error of 16.7%; 11.9% of cases suspicious for abuse were misclassified as an accidental injury (sensitivity error); 23.3% injuries due to an accidental mechanism were incorrectly categorized as an abusive injury (specificity error). After the 300-case intervention, diagnostic error in accuracy, sensitivity, and specificity were 1.6%, 0.7%, and 6.6%, respectively. The mean time to complete 300 cases was 60.5 (SD 34.3) minutes. Proportion of evaluation responses ranked at a least 3 was 100%, and at least 4 was 77.7%.
Conclusion: After about 1 h of deliberate practice, diagnostic error in identifying a suspicion for an abusive burn or bruise injury was reduced by about 10-fold. Most participants ranked the experience highly, including in transferability of knowledge to practice. Since the most motivated participants completed the intervention, our results may not be generalizable to all front-line physicians. Future directions include completing case-level analyses to identify the variables that predict for diagnostic challenges at the bedside.
Keywords: innovations in emergency medicine education, pediatrics, child abuse

LO48

Undergraduate medical education point-of-care ultrasound curriculum development

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Innovation Concept: University of Ottawa's Undergraduate Medical Education (UGME) point-of-care ultrasound (POCUS) curriculum currently focuses on medical students in years 1 and 2 (pre-clerkship). The goal of this project is to use a systematic a priori approach to formulate a multi-specialty consensus on POCUS learning objectives for clerkship students and create clinical scenarios that will help with the development of a competency-based UGME POCUS longitudinal spiral curriculum.
Methods: A systematic a priori approach was used to build consensus. A panel of 8 POCUS experts were recruited from the Departments of Anesthesia, Emergency Medicine, Internal Medicine, and Radiology. An initial list of 35 potential POCUS learning objectives for clerkship students was identified through a literature review. Through two rounds of engagement and discussion, experts evaluated these objectives based on feasibility of resources, implementation challenges, and exposure to POCUS during clerkship rotations. Based on expert consensus, clerkship learning objectives and clinical POCUS scenarios were developed and reviewed by experts to ensure clinical accuracy.
Curriculum, Tool or Material: Of the 35 POCUS learning objectives based on literature review, the experts reached consensus to include 19 and exclude 16. Nine clinical POCUS scenarios were developed and will leverage the uOttawa Brightspace learning platform to build upon prior pre-clerkship objectives and enhance clerkship POCUS experiences. The scenarios were developed to allow for a student to create a differential diagnosis, decide which ultrasound scans are required to answer a clinical question, interpret ultrasound videos/images and develop a final diagnosis. The interactive POCUS scenarios involve the following: cardiac, lung, abdominal, kidney and focused assessment with sonography in trauma.
Conclusion: Through systematic multi-disciplinary expert consensus, this project established 19 POCUS learning objectives and 9 clinical scenarios. This systematic approach allowed for effective engagement and discussion between POCUS experts with ongoing development of a competency based UGME POCUS longitudinal spiral curriculum.
Keywords: innovations in emergency medicine education, point of care ultrasound, curriculum development

LO49

A single day disaster medicine curriculum for an emergency medicine residency program

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Innovation Concept: Canadian healthcare is unprepared to respond to disaster events. Emergency Medicine (EM) physicians are positioned at the forefront of these events and must be competent in the application of Disaster Medicine (DM) principles. Development of

curricula in DM is a priority of EM training, however, programs have struggled to incorporate student exposure to these low-frequency, high-acuity events. We sought to remedy this by developing an annual single day DM curriculum centered on multimodal experiential learning for a residency program in Canada that could be replicated across programs.

Methods: We followed Kern's model as a framework for our innovation. Our objectives were developed by triangulating a literature search, focus groups and a consultation with a DM expert. Given these events are infrequent and involve a high degree of communication and coordination, we created both a tabletop and fully immersive simulation to maximize resident exposure.

Curriculum, Tool or Material: The curriculum was provided to trainees from both Royal College EM and Family Medicine EM programs and was broken into three phases. The first phase was a lecture from a DM expert, centered on the developed objectives. The second phase consisted of a tabletop simulation with allied healthcare providers, aimed at application of phase one concepts. For the third phase our simulation lab was converted into a regional emergency department (ED) fully staffed with allied health participants and confederates. The teams participated in a 45 min, fully immersive simulation of a mass casualty incident with both high-fidelity mannequins and patient actors. We had trained debriefing staff in each area of the ED who led a 'hot debrief' immediately after the exercise. This was followed by a large group debrief. The third phase was run three times so all trainees could participate, and senior residents could assume the ED command role.

Program evaluation strategies included participant and facilitator feedback via surveys capturing both modified Likert scale and qualitative comments, as well as pre and post training DM knowledge exams. Immediate and 6-month post training assessment scores improved 170% and 148% respectively, compared to pre training results.

Conclusion: We showed improved DM knowledge and retention, as well as overwhelmingly positive feedback for this innovative curriculum. This single day DM curriculum provides EM educators with a brief, structured approach to DM education.

Keywords: innovations in emergency medicine education, disaster medicine, simulation

LO50

Missing occlusions: quality gaps for ED patients with Occlusion MI

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Introduction: Guidelines using the ST-elevation Myocardial Infarction (STEMI) paradigm encourage monitoring of "false positive STEMI" (code STEMI without culprit) as a quality metric. However, they ignore "false negative STEMI" (non-STEMI with occlusion myocardial infarction [OMI]), despite at least a quarter of Non-STEMI later found to have a totally occluded artery, with reperfusion delays leading to higher mortality. We evaluated the hospital course and discharge diagnosis of emergency department (ED) patients with acute coronary syndrome (ACS) using STEMI vs OMI paradigms, to highlight quality gaps and opportunities for improvement.

Methods: This retrospective chart review examined all patients admitted through two academic EDs with an admission or discharge diagnosis of ACS, from June 2021 to May 2022. Patients were categorized as (1) OMI (acute culprit lesion with TIMI 0-2 flow, or TIMI 3 flow with peak (4th generation) troponin I $>$ 10,000ng/L; or, if no angiogram, peak troponin $>$ 10,000ng/L with new regional wall motion abnormality), (2) NOMI (Non-OMI, i.e. MI without OMI) or (3) MIRO (MI Ruled Out: negative troponin). Patients were stratified by whether they were admitted as STEMI or not. Initial ECGs were reviewed for computer interpretation of "STEMI", and admission/discharge diagnoses were compared.

Results: Among 382 patients there were 141 OMI, 181 NOMI, and 60 MIRO. Only 40% of OMI were admitted as STEMI: 60% of these had "STEMI" on ECG, and median door-to-cath time was 103 minutes (IQR 71–149). But 60% of OMI were not admitted as STEMI: 1% of these had "STEMI" on ECG ($p < 0.001$) and median door-to-cath time was 1712 minutes (IQR 1043–3960; $p < 0.001$). While 14% of STEMI were considered false positive and had a different discharge diagnosis, 32% of Non-STEMI had OMI but they still had a discharge diagnosis of "Non-STEMI."

Conclusion: The OMI paradigm illustrates significant quality gaps in ED patients with ACS. Prospectively, STEMI criteria miss a majority of OMI, leading to preventable delays to reperfusion. Retrospectively, discharge diagnoses change to highlight false positive STEMI but never false negative STEMI, preventing providers from learning from missed occlusions. By classifying patients as OMI/NOMI rather than STEMI/Non-STEMI, health systems can reveal quality gaps and design interventions to address them. These include advanced ECG interpretation, point-of-care ultrasound for regional wall motion abnormalities, and urgent reperfusion pathways for refractory ischemia.

Keywords: ECG, STEMI, ACS

LO51

Impact of a spinal motion restriction protocol that empowers paramedics to assess low-risk trauma patients and transport them without backboard immobilization on patient-determined outcomes

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Introduction: We recently evaluated a strategy authorizing paramedics to assess low-risk trauma patients using the Canadian C-Spine Rule (CCR) and selectively transport patients without immobilization. Immediately following our trial, the Ontario Ministry of Health introduced a new spinal motion restriction (SMR) protocol allowing most patients to be transported without a backboard, with or without a cervical collar as per the CCR. This study determined the incremental benefit of the SMR protocol on patient-determined outcomes including pain and discomfort.

Methods: We analyzed and compared data from both the 9-months period during which the CCR was rolled out across 11 Ontario communities in a stepped wedge cluster-randomized trial and the 5-months SMR period immediately following. Paramedics completed a standardized form for all consecutive eligible stable adult patients at risk for c-spine injury over the 14-months period. Patient-reported pain and discomfort (10-point ordinal scale) were assessed when transferring care to emergency staff. Clinical outcomes were obtained using provincial health administrative databases up to 30 days post injury. We compared immobilization status, moderate pain and discomfort (defined as $\geq$ 5/10) using random effects logistic regression adjusted for age and sex, reporting adjusted odds ratios (adjOR).

Results: We analyzed 6408 patients: mean age 48 years [range 8-103], female 51.5%, MVC 48.2%, fall 37.4%, transported to hospital 93.9%, mean overall pain (4.7/10; SD 3.0) and discomfort (5.4/10; SD

2.9), acute c-spine fracture/dislocation 8.7%, and required stabilization 0.9%. The proportion of patients transported with backboard immobilization significantly decreased from 1433/1857 (77.2%) in the control (reference), to 879/2002 (43.9%) in the CCR intervention (adjOR 0.27; 95% CI 0.21–0.35, $p < 0.0001$), and to 89/2511 (3.5%) in the SMR periods (adjOR 0.009; 95% CI 0.006–0.01, $p < 0.0001$). Compared to control, pain and discomfort significantly decreased in CCR and SMR periods respectively [adjOR for pain in CCR and SMR (0.63; 95% CI 0.50–0.79, $p < 0.0001$ and 0.43; 95% CI 0.30–0.61, $p < 0.0001$) and adjOR for discomfort (0.59; 95% CI 0.47–0.75, $p < 0.0001$ and 0.61; 95% CI 0.42–0.88, $p = 0.008$)].

Conclusion: Following the introduction of the SMR protocol, paramedics safely transported significantly fewer low-risk trauma patients without a backboard and with significantly less pain and discomfort. The SMR should be broadly adopted and will significantly improve patient care.

Keywords: prehospital, Canadian c-spine rule, backboard

LO52

Evaluating the effectiveness of a small nomadic medical assistance team to support remote Indigenous communities in Canada, during COVID outbreaks.

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Background and Aim Statement: In Canada, access to health care is considered a universal right, however many Indigenous communities exist in austere settings and the major health care provided is through a nursing station. As a result, they are vulnerable to developing acute staff shortages during COVID outbreaks.

Aim: Trial the effectiveness of a NoMAT to mitigate sudden staff shortages caused by a Covid outbreak in a remote Indigenous Community served only by a Nursing Station.

Measures and Design: Indigenous Services Canada funded a pilot and NoMAT was deployed March 13 to April 2, 2022 to small Indigenous community in remote Northern Ontario, Canada.

The team consisted of up to 7 personnel: MD, Nurse, Nurse Practitioner, Physician Assistant, Paramedic, Data Support and Logistics. Individuals served from 1-2 weeks of a 3-week deployment. If there was a shortage the MD could be virtual. Local health resources were used and the team resided the local school.

Results/Outcomes: The NoMAT rapidly: 1. worked with the local team to co-develop outbreak management, 2. identify high risk patients for treatment, 3. supported non-covid patient care and 4. reduced a backlogs of care

Discussion/impact: Conclusion: The NoMAT strategy is highly effective and efficient in mitigating the impact of both COVID surges, and reducing backlogs of care. The next step is developing a proposal for full time mobile teams consisting of staff who work in urban settings, but willing to dedicated a portion of their time to work in under-resourced settings.

This would increase both the remote poorly served First Nations Communities in Canada, allow clinicians to maintain their skills by working in higher volume, higher acutity centres AND increase the overall understanding of what some may consider to be third world conditions in Canada.

Keywords: quality improvement and patient safety, indigenous communities, resource deficient settings

LO53

Rural trauma outcomes in Saskatchewan

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Introduction: Approximately 60% of the Saskatchewan population lives more than one hour from a tertiary care center. Unfortunately, trauma still occurs in remote areas, and the literature suggests this can cause disparate outcomes. To our knowledge, trauma outcomes of rural patients in Saskatchewan have never been evaluated. The aim of our work is to accurately report differences in both patient demographics and injury characteristics between our rural and urban trauma patients while also evaluating how these factors contribute to outcome and complication rates.

Methods: We identified a historical cohort of all Level 1 trauma activations presenting to Royal University Hospital (RUH) from April 1, 2020 to March 31, 2022. All 823 charts were reviewed, and variables of interest extracted. The cohort was divided into two groups (Urban and Rural) based on the trauma location. Descriptive and multi-variate analyses were performed for factors associated with our outcomes of interest. The primary outcome of interest was 30-days mortality. Secondary outcomes of interest were hospital length of stay, readmission to hospital within 30-days of discharge, and complication rate.

Results: Our data demonstrate that rural trauma patients were younger (34.1 vs. 37 years: $p = 0.002$), more likely to be male (80.3 vs.74.4%; $p = 0.040$) and had higher injury severity scores (ISS; 12.3 vs. 8.3: $p < 0.0001$). Urban trauma patients were more likely to sustain penetrating trauma (42.5 vs. 28.5%; $p < 0.0001$). There were no differences in morbidity and mortality between the two groups, however rural trauma patients had longer lengths of stay (8 vs. 7 days; $p < 0.0001$).

Conclusion: While key differences in patient demographics, injury type and injury severity were identified, outcomes were largely similar in our urban and rural trauma patients. The longer length of stay in our rural patients may be attributed to disposition challenges for patients who live remotely, or possibily due to higher ISS. We hope our Saskatchewan-specific data can be used to inform resource allocation decisions to better serve our unique patient population.

Keywords: trauma, rural, urban

LO54

An emergency department quality improvement intervention for decreasing time to pain medication in sickle cell disease

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Background: Sickle cell disease (SCD) is painful and life-limiting. Most people with SCD in Canada are Black. Patients with SCD report delays in emergency department (ED) analgesia. No studies exist in Canada on improving time to analgesia for adults with SCD. Our team, including patients, designed/implemented ED interventions including patient-led education and increased community engagement from Nov 2020–Jan 2021 to address barriers to care. Aim: We used the Model for Improvement, aiming to decrease time to opioid analgesia (TOA) by 30 min post intervention (Jan 2021–Jan 2022)

compared to baseline (Jan 2019–Jan 2020) through the PDSA approach. We anticipated a significant increase in the number of patients who received opioid analgesia within 30 min as recommended by Ontario clinical guidelines.
Measures/Design: Our interdisciplinary team used chart reviews to establish TOA pre/post intervention for adult patients with SCD. We also collected data on covariates including ED volume. We used pre-pandemic data as our baseline and included a control group (ED patients with renal colic (RC)) in order to mediate pandemic impacts. Outcome measures included TOA and percentage of patients receiving analgesia within 30 min of triage. Process measures included use of ED order sets and analgesia timing relative to MD assessment. Balancing measures include inpatient admission rates.
Results: We reviewed 456 SCD visits (231 pre, 225 post) and 406 control RC visits (244 pre, 162 post). The proportion of visits for SCD achieving the 30 min target for opioids tripled post-intervention (5.2–15.6%). The run chart for SCD visits showed a 10 data points shift below the SCD group median post (pre median 87 minutes, IQR 80; post median 62, IQR 62). This difference did not remain statistically significant upon considering covariates such as ED volume. No shifts were noted in the run chart for the RC group. There was an interaction between the SCD and RC groups pre and post intervention with a trend toward longer TOA for the RC group (median 110 IQR 135 pre vs. median 135 IQR 132 post). The SCD run chart suggested a trend back toward the pre-intervention baseline after the intervention, with five consecutive months showing increasing time to analgesia.
Discussion: Data shows that improving time to opioid analgesia for patients with SCD is possible, even during a pandemic. Advocacy and partnership with patients with SCD is needed.
Keywords: quality improvement and patient safety, sickle cell disease, pain management

LO55

Effectiveness of accelerated diagnostic protocols for reducing emergency department length of stay in patients presenting with chest pain: a systematic review

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Introduction: In recent years, there has been an increase in the use of high-sensitivity troponins and accelerated diagnostic protocols (ADPs) for the assessment of chest pain emergency departments (ED). This study aimed to quantitatively summarize the operational and clinical outcomes of ADPs implemented for patients with suspected cardiac chest pain.
Methods: To be considered eligible for inclusion, studies must have implemented some form of ADP within the ED for evaluating adult (age $\geq$ 18 years) patients presenting with chest pain using Tn assays. The primary outcome was ED length of stay (LOS) defined as the time from triage to discharge. Secondary outcomes included the proportion of patients requiring admission and the proportion of patients with major adverse cardiac events (MACE). Randomized controlled trials (RCT) and observational studies were both considered for inclusion. Studies were pooled if they represented similar populations, outcomes using Tn/hsTn and serial testing times.
Results: Twenty-one articles involving 248,721 patients met the inclusion criteria, including three RCTs and 18 observational studies. A significant reduction in the total ED LOS was reported in 12 (67%) observational studies and two (67%) RCTs. There was a strong correlation (Pearson's $= 0.69$) between the baseline ED LOS and the reduction in LOS following ADP implementation. No study reported an increase in the proportion of patients admitted after the introduction of an ADP. No study reported a significant difference between the proportion of patients experiencing MACE before and after ADP implementation.
Conclusion: ADP implementation helps decrease ED LOS, most noticeably within sites who have a high baseline ED LOS and should be considered by hospitals or health care entities searching for strategies to improve operational efficiency; this decreased LOS is seen even in the absence of any change in troponin assay type. The decrease in LOS did not come at the cost of increased hospital admissions or more patients experiencing subsequent adverse events (e.g., MACE). The observed benefits translated across multiple health regions.
Keywords: chest pain, troponin, efficiency

LO56

Optimizing ED return visits for ultrasound imaging: a quality improvement initiative

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Background and Aim Statement: The practice of bringing patients back to the ED the next day due to the lack of after-hour formal US imaging places extra strain on patients and the ED. A new clinical pathway utilizing community radiology clinics is necessary to guide physicians in determining the appropriate location and timing of imaging and to decrease practice variation.
Aim: To decrease the number of patients returning to the ED for a formal US scan by 50% within 6 months of a clinical pathway implementation.
Measures and Design: The primary outcome measure was ED resource utilization for next-day ultrasound (NDUS) and Length of stay (LOS); the Process measure was the physician ordering pattern; and the Balancing measure was the Number of US imaging performed or deferred off-site in community imaging centers. We conducted a retrospective chart review of all patients $>= 17$ years that utilized the available spots for NDUS in two urban EDs sites between January and June 2019–2022. Our multidisciplinary team did a Root Cause Analysis using a process map and Fishbone, then developed a clinical pathway that was shared and discussed with the ED physician group and implemented in January 2022. We performed a descriptive statistical analysis of variables and created run charts to demonstrate changes resulting from our interventions.
Evaluation/results: The study screened for ED NDUS usage in 123,386 patients who visited EDs between January and June 2019–2022. There was a 54% decrease in the percentage of patients returning to the ED for formal NDUS after implementing the new clinical pathway. The run charts demonstrate the point at which the ED visits started decreasing is after implementing the clinical pathway in January 2022. Although there was no difference in the average LOS of the individual patient before and after pathway implementation, there was a decrease in the summative LOS post-pathway implementation. In addition, patients referred to community imaging centers could get their scans done in time.
Discussion/impact: This study shows that a clinical pathway with multidisciplinary input has the potential to decrease the number of unnecessary ED visits for formal US imaging. Streamlining this clinical pathway with continued discussion with key stakeholders can ensure a further improvement of its efficacy, sustainability, and use locally and in other EDs across Canada.
Keywords: quality improvement and patient safety, ultrasound imaging, ED overcrowding

LO57

Pre-post implementation of computerized physician order entry on patient centred outcomes in the emergency department: a systematic review

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Introduction: Computerized physician order entry (CPOE) allows medical professionals to enter and send orders electronically in lieu of paper charts. Although the use of CPOE may reduce certain types of medication errors, it may also slow clinicians in a fast-paced environment such as the emergency department (ED). The objective of this systematic review was to examine the effect of CPOE implementation on ED patient outcomes compared to traditional paper order entry.
Methods: Electronic searches of MEDLINE (Ovid), EMBASE, CINAHL, Web of Science, and EMB Reviews were completed for English-language studies published in 1983–2022. Studies were included if they compared traditional order entry to CPOE in a pre-post design in an ED or urgent care setting. Outcomes included time to physician initial assessment (PIA), ED length of stay (LOS), time to first order, adverse drug events (ADE), ordering errors, mortality, and the proportion of patients who left without being seen (LWBS) or against medical advice (LAMA). Screening, full-text review, and data extraction were independently done by two reviewers, with disagreements resolved by consensus.
Results: 4455 articles were identified for title/abstract screening, of which 139 underwent full-text review. 23 articles met inclusion criteria, with eighteen reporting ED wait times, five reporting medication errors, four reporting mortality, and three reporting LWBS/LAMA. Two studies reported longer PIA times (5–39 min) and two reported longer LOS for discharged patients (5–66 min) post-CPOE implementation. For time to first order, two studies reported shorter times (6 to 25 minutes) and two reported no differences. For overall LOS, results were inconclusive (two studies reported longer times, one reported a shorter time, and one reported no difference). For ADE incidences, three studies reported reductions (1–11% reduction) and one reported no difference. For ordering errors, three studies reported reductions (2–93% reduction). One study reported no difference in mortality. Two studies reported increased incidences of LWBS (1–7% increase) and one reported no difference. One study reported an increased incidence of LAMA (1% increase).
Conclusion: CPOE implementation may increase time to PIA and LOS for discharged patients, but may also lower incidences of ADEs and ordering errors. Future studies should focus on ways to optimize the CPOE interface and better integrate it within ED flow.
Keywords: computerized provider order entry, patient outcomes, emergency department

LO58

Patient reported outcomes from a novel virtual care follow-up program.

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Introduction: Currently, a gap in care exists for emergency department (ED) patients who do not require hospitalization and may benefit from follow-up within 72 h, a time frame in which it is often difficult to access another provider. Most EDs have little or no infrastructure to support this type of follow-up. Therefore, we developed and implemented an ED-led 72-h virtual care follow-up program for patients discharged from the ED. The objective of this study was to determine patients' perception of the quality of care using the Patient Reported Outcome Measure after Emergency Department Visit (PROM-ED) score.
Methods: The pilot phase of this prospective observational study occurred from January 1 to March 31, 2022, at an urban community teaching hospital (annual ED census 110,000). ED physicians self-selected patients who were discharged home to be enrolled in the follow-up virtual care program. Within 72 h, the treating physician called the patient to provide follow-up care. After one week, patients who completed a virtual follow-up visit were called by a research assistant and invited to complete a standardized, 22-item survey, which included a series of questions related to satisfaction and patient-reported outcome measures.
Results: Of the 700 patients enrolled in the virtual care follow-up program, 107 (15.3%) completed the survey. 93% of respondents were satisfied or very satisfied with the virtual care follow-up they received. 44% of participants indicated the virtual care visit prevented a return ED visit, and 63% of respondents indicated the follow-up virtual care they received was similar to or better than an in-person return ED visit. For the PROM of patient understanding, 86% of patients said they had answers to all the questions they had related to their health concerns. For the PROM of reassurance, 80% felt at ease and reassured about their health concern after their virtual visit. Finally, for the PROM of patients having a plan after leaving the ED, 82% reported they knew what to do if their symptoms returned or worsened.
Conclusion: The 72-hour post-ED visit virtual follow-up program may prevent unplanned return ED visits and help improve the patient experience. Further research on clinical outcomes and the cost-effectiveness of the virtual care follow-up program is ongoing.
Keywords: patient-centered outcomes, virtual care, post-discharge follow-up

LO59

Healthcare utilization and costs of patients using virtual urgent care services in Ontario.

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Introduction: As part of the COVID-19 pandemic response, the Ontario Ministry of Health funded a pilot program of 14 virtual urgent care (VUC) initiatives across the province. The objective of this study was to estimate 30-day healthcare utilization and costs of patients using VUC services.
Methods: We used patient-level encounter data from each VUC visit linked to provincial administrative databases to determine subsequent 30-day healthcare utilization and costs. Eligible encounters required a valid, linkable Ontario Health Insurance Plan (OHIP) number and patients had to be eligible for OHIP for at least 365 days preceding the index VUC date. Thirty-day health care expenditures (associated with physician and ED encounters and hospitalizations) expressed in 2020–2021 Canadian dollars were computed using standardized costing algorithms.
Results: Of the 19,595 VUC patient encounters linked to administrative data, 12.5% and 21.6% had an in-person ED visit within 72 h and 30 days of the index VUC visit, respectively; and 2.2% and 3.9% had a hospital admission within 72 hours and 30 days, respectively. There were very few ($n = 1–5$; $< 0.03\%$) deaths within 30 days, none from the paediatric sites. Overall mean 30-day healthcare

utilization costs per person were $966.99 plus $150.56 VUC infrastructure costs (operational funds to set up VUC) for a total cost of $1,117.54 per person, with 30-day total costs of $21,892,666 for 19,595 patients. Overall mean 30-day costs per person were lowest in the paediatric sites ($625.32) where 30-day hospitalization was the lowest, and highest in the academic sites ($1,827.77) where 30-day hospitalization was the highest.
Conclusion: Most patients using VUC services were managed by the virtual care provider without the need for a subsequent ED visit or hospital admission within 30 days of the index VUC visit. We hope the findings from this evaluation will help inform provincial policy decisions on how to best structure and support VUC services, including the role of EDs, moving forward in a sustainable manner.
Keywords: virtual care, emergency medicine, healthcare utilization

LO60

Cost analysis and economic evaluation of a virtual pediatric emergency department pilot program

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Introduction: Virtual care implementation within emergency departments (ED) have been consistently highlighted as promising alternatives to deliver urgent care amidst the strain of the COVID-19 pandemic. However, the financial implications remain uncertain. The Children's Hospital of Eastern Ontario (CHEO) launched Canada's first virtual pediatric emergency department (VPED) from May 2020 through November 2021. The objective of this study is to (i) conduct a cost analysis of the VPED program, and (ii) compare the VPED costs to in-person ED costs to inform future resource allocation decisions.
Methods: We developed a decision tree model to retrospectively estimate the incremental costs and returns on investment (ROI) of virtual care relative to in-person care, using both billing codes and salary information for physician compensation. The percentage of patients who would have presented to the ED in-person if VPED was not available and the number of referrals from VPED to in-person assessments were estimated using previously published data. Costs were calculated from a health system payer perspective and were converted into 2021 Canadian dollars. We compared expected costs with and without VPED, and assessed overall as well as per patient cost savings of implementing VPED.
Results: The VPED provided care to 7394 patients. In the base case using billing codes, VPED saved $890,000 ($120 per patient), resulting in an ROI of 0.81. One-way sensitivity analyses suggest that overall cost savings were most sensitive to the proportion of virtual care patients who would have received in-person care (range $0.30–1.70 million), followed by ED overhead costs (range $0.64–$1.14 million). Multivariate sensitivity analyses demonstrated robust cost savings of $0.92 million (95% CI 0.85–0.99) in a scenario using billing codes to calculate costs, and savings of $1.04 million (95% CI 0.96–1.12) if physician salaries were used. VPED resulted in a positive ROI of $0.78–$1.00 for every dollar invested (billing codes: $0.83, 95% CI 0.78–0.89; salaries $0.94, 95% CI 0.87–1.00).
Conclusion: These findings suggest that VPED reduced health care costs and produced an excellent ROI, even after accounting for possible over-use of the program due to the ease of access. The concept of virtual care implementation in EDs is still evolving but upon initial analysis, it represents a financially valuable health service.
Keywords: virtual care, cost analysis, VPED

LO61

Creating an inventory of emergency virtual care initiatives in Canada: national CAEP survey

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Introduction: Virtual care (VC) activities have emerged across the country due to COVID. As Emergency Medicine deals with all acute health issues across the full age and severity range, our discipline is uniquely poised to leverage VC to triage patients, augment pre-hospital care, offer virtual diagnosis and treatment, and facilitate consultations. VC can reduce patient volume presenting to ED and overcrowding, and augment ED human resource capacity. A CAEP National Survey was launched in September 2022 to create an inventory of ED-led VC programs in Canada, identify their purposes and characteristics, and promote knowledge exchange nationally.
Methods: We created and obtained ethics approval to conduct an electronic survey using convenience sampling of Canadian emergency physicians, distributed through the CAEP email listserv. This survey asked seven questions to uncover the purpose, population served, clinical functions, funding models, and outcomes. Mixed methods analysis was completed, with thematic analysis, inductive and deductive coding by two independent analysts.
Results: 107 out of 1144 CAEP members responded to the survey to date. 8 programs were identified: four in Ontario, one in Alberta, BC, Manitoba, and Nova Scotia. 5 programs involved multiple ED sites/healthcare regions and three were single centre. All programs engaged ED physicians. Purposes of the programs included diverting low acuity patients away from the ED, improving follow-up from EDs, and augmenting existing virtual care solutions (nurse-triage, and consultation to support rural providers). Different electronic medical records and video-conferencing plaforms were utilized, with variable integration into existing healthcare IT infrastructure. Key outcomes including most common patient presentations, proportion of patients diverted from EDs, number of adverse events, and cost-effectiveness of some of these programs were also obtained.
Conclusion: Conclusion: Several ED-led virtual care program were documented, with variation in purposes, funding models, durations, IT infrastructure, and evaluation metrics. We will obtain more in-depth information through key informant interviews with key stakeholders/program leads and will report our findings at CAEP 2023. The findings in this inventory will help establish a living database to strengthen existing programs and stimulate new ones via knowledge sharing through the CAPE Digital Emergency Medicine Committee.
Keywords: virtual care, ED crowding, CAEP survey

LO62

The impact of the COVID-19 pandemic on call volume and appropriateness of Health Link referrals to the emergency department in Alberta

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Introduction: In Alberta, Health Link (HL) provides a 24-h, nurse staffed, phone resource to the public for health care advice. HL nurses direct patients to either seek care in the emergency department (ED), follow up with a primary care provider or provide self-care at home. While there has been an expansion of telehealth during the pandemic, the ability for HL to meet pandemic demand has not been studied. Therefore, the aim of the present work is to provide a

descriptive analysis of HL referral patterns to the ED prior to and during the COVID-19 pandemic.
Methods: The two data periods selected were from January 1, 2018 to December 31, 2019 and July 1, 2020 to June 30, 2022. The first 6 months of 2020 were excluded due to a large increase in call volume leading to missing data in the administrative database. HL calls were categorized as likely appropriate referrals if the patient was referred, and presented within 24 h, to the ED and on arrival had: a Canadian Triage and Acuity Scale (CTAS) of $<= 3$; or a CTAS of 4/5 and the patient was admitted, a specialist was consulted, or diagnostic imaging or lab tests were completed during the visit. The primary outcome was the percentage of likely appropriate referrals among all calls received by HL that presented to an ED; the secondary outcome was admission rate as compared to the general ED population.
Results: In the 2018–2019 and 2020–2022 samples, respectively, there were 900,196 and 891,509 calls to HL, of which 845,372 and 832,730 had personal health numbers attached to their call. There were 211,723 (25.0%) and 213,486 (25.6%) people referred on to the ED, however, only 140,614 (66.4%) and 143,322 (67.1%) followed through on the advice received and presented to an ED. These presentations account for 3.2% and 3.8% of all ED visits during the study periods. Of the patients who presented to the ED, 84.3% and 86.7% were determined to be likely appropriate referrals. Of the patients sent to the ED by HL, the admission rate was similar to that of the general ED population 8.08% vs. 9.07% respectively in 2018–2019 and 7.81% vs. 10.19% in 2020-2022.
Conclusion: HL referrals to the ED represent only a small percentage of all ED visits. Most referrals by HL are likely appropriate and have similar admission rates as compared to the general ED population. The COVID-19 pandemic does not appear to have significantly altered the rates of calls to HL, the number of HL calls referred to the ED, nor the likely appropriateness of those referrals.
Keywords: health link, tele-triage, administrative data

LO63

High use of the emergency department among adult patients in southern Ontario during the COVID-19 pandemic

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Introduction: Patients with frequent use of the emergency department (ED) are a small proportion of the population but make up two-thirds of health costs. Little is known about how the COVID-19 pandemic affected this vulnerable group. The objective of this study was to explore the characteristics and use patterns of these patients during the first year of the pandemic.
Methods: An analysis of administrative data in Southern Ontario for fiscal year 2020/21 was undertaken. Adult patients ($\geq$ 18 years old) with high ED use ($\geq$ 5 visits) were included. Prior history of high ED use came from fiscal years 2012/13–2019/20. Information on ED encounters, hospitalizations, and patient demographics, including deprivation (Ontario Marginalization Index), was abstracted from Integrated Decision Support using National Ambulatory Care Reporting System and Discharge Abstract Database.
Results: 12,958 patients with high ED use were identified, which represents a 29% reduction over the previous year. Of the individuals, 45% (n = 5782) had a prior history of high ED use. The majority of the patients were female (52%, n = 6755), were 52 years of age on average (SD: 21), mostly had a primary care physician (94%, n = 12,235), and a third (33%, n = 4337) were receiving home care services. In terms of geography, 12% (n = 1,504) resided in rural areas while 36% (n = 44,38) resided in the most deprived areas, which was similar to the previous year. Patients made 104,446 ED visits, ranging from 5-635 per person with an average of 8 visits (SD: 11) and a median of 6 visits (IQR: 3). In terms of visit acuity, 81% were CTAS 1–3 with the majority being CTAS 3 (53%). The most common ED discharge diagnosis categories were abdominal and pelvic pain (9%) and pain in throat and chest (5%). Patients spent a mean of 6.6 hours (SD: 5.7, median: 4.7, IQR: 5.6) in the ED. Close to a fifth of visits (n = 17,406) resulted in a hospital admission, which was higher than during the previous year at 15%. The most common discharge diagnoses were: heart failure (4%), chronic obstructive pulmonary disease (3%), acute myocardial infarction (2%).
Conclusion: During the first year of the pandemic, the number of patients with high use of the ED decreased by a third compared to the previous year, while slightly more patients were admitted. Despite this, the proportion of demographic and diagnostic characteristics of the patients remained similar. As COVID-19 continues to affect overburdened EDs, it is important to investigate how patients with high ED use are affected.
Keywords: frequent ED use, COVID-19, patient flow

LO64

When treat and release fails: characteristics and outcomes of COVID-19 patients who return to the emergency department after discharge: an observational study by the Canadian COVID-19 Emergency Department Rapid Response Network (CCEDRRN)

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Introduction: Unplanned return emergency department (ED) visits are important markers of quality of care. Understanding the pattern of return ED visits among COVID-19 patients is essential in health-system planning at a time when COVID-19 transitions to an endemic infection. This study describes the characteristics and outcomes of consecutive COVID-19 patients who returned to the ED for a COVID-related visit within 30 days and compared their outcomes to those who visited the ED only once.
Methods: This study used observational data from 47 Canadian sites between March 1, 2020, and March 31, 2022. Three mutually exclusive patient groups were formed based on COVID-19 episodes and return COVID-related ED visits within 30 days. Data are summarized and compared across groups. Multivariable logistic regression modeling assessed the patient characteristics associated with being in the multi-visit (MV) group compared to the single-visit (SV) group for patients who were discharged and alive at the first ED visit. All healthcare utilization within 90 days of diagnosis was defined as a single COVID-19 episode.
Results: 39,909 patients with COVID-19 made 45,099 COVID-19-related ED visits: 35,468 patients (89%) had one visit (SV group), 4341 (11%) had returned to the ED (MV group) within one COVID-19 episode, and 100 ($<$ 1%) had $>$ 2 COVID-19 episodes. Amongst all patients, the 72-h return rate was 5.4%. Among the COVID-19 patients returning to the ED within one COVID-19 episode, 49% returned within 72h, with an average number of ED visits of 2.2 and all returns happening within a median time of 5 days (interquartile range 3, 9). Multivariable modeling showed that return was more likely for patients who were older (odds ratio [OR] = 1.25 per 10 years, 95% confidence interval [CI] 1.22, 1.28), pregnant (OR = 1.86, 95% CI 1.46, 2.36), and who had comorbidities (e.g., OR = 1.72, 95% CI 1.40, 2.10) for cancer; OR = 2.18, 95% CI 1.42, 3.36 for organ transplant), current/prior substance use, higher index ED visit acuity, higher temperature, and WHO severe disease

(OR = 1.41, 95% CI 1.21, 154). Although vaccination status was unknown for many patients, fully vaccinated patients were less likely to return than unvaccinated patients (OR = 0.48, 95% 0.34, 0.70).
Conclusion: A high proportion of COVID-19 patients returned to the ED within the first two pandemic years, incurring substantial resources. Future studies should focus on vaccine data linkage and on reasons for ED return visits.
Keywords: coronavirus diseases/COVID-19, frequent users, emergency medicine

LO65

Predictors of mortality in older patients with moderate traumatic brain injury

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Introduction: Traumatic brain injuries (TBI) are a significant cause of death and disability. Higher mortality has been reported in older patients with moderate TBI compared to their younger counterparts. Few studies have focused on moderate TBI and factors such as comorbidities, often measured in older adults, which could influence mortality. This study aims to identify factors associated with mortality in older patients with moderate TBI.
Methods: We conducted a retrospective cohort study using data from the Quebec Trauma Registry (RTQ). Patients aged $\geq$ 16 years with a moderate TBI (Glasgow Coma Scale of 9–12) were included in our analyses. We stratified our population into four age groups: patients aged 16–64 years, 65–74, 75–84 and those aged $\geq$ 85 years. We used a logistic regression model to identify factors associated with mortality.
Results: A total of 1005 patients met our inclusion criteria. Among these, 70.6% were isolated TBI patients while 29.3% were polytrauma patients; 61.9% of our population were aged $<$ 65 years, 12.3% was 65–74 years old; 16.7% was 75–84 years old, and 9.1% was aged $\geq$ 85 years. Overall, in-hospital mortality occurred in 20.1% of our cohort and seemed to increase with age: 30.0%, 37.0% and 52.0 % in patients aged 65–74, 75-84 and $\geq$ 85 years, respectively. Older age (patients $\geq$ 85 years old: OR = 13.3 [95% CI: 7.3–24.36]), the number of comorbidities (patients with $^{3}2$ comorbidities: OR = 1.82 [95% CI: 1.10–3.01], initial hypotension ($<$ 110 mm Hg: OR = 1.74 [95% CI: 1.03–2.94]); Injury Severity Score (OR = 1.04 [95% CI: 1.01–1.07]); intraparenchymal hematoma (OR = 3.01 [95% CI: 2.02–4.48]) and other moderate TBI injury patterns (including cerebral edema, pneumocephalus, subpial hemorrhage, and pituitary injury (OR = 2.60 [95% CI 1.74–3.87])were associated with in-hospital mortality.
Conclusion: Comorbidities, initial hypotension ($<$ 110 mm Hg), trauma severity and intraparenchymal injury were associated with in-hospital mortality in older patients with moderate TBI. These factors could be integrated into future clinical prediction rules to offer tailored care to the older trauma population.
Keywords: head injury, geriatric, glasgow coma score

LO66

Barriers and facilitators to the implementation of point of care testing for HIV in the emergency department: a mixed-methods study.

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Introduction: 1 in 7 Canadians living with HIV do not know their status. Patients at increased risk of HIV routinely access the Emergency Department (ED), yet few are tested, representing a missed opportunity for linkage to care. Rapid HIV testing provides reliable results within the same ED encounter, but is not routinely implemented or available in Canadian EDs. We aimed to identify and evaluate barriers and facilitators to implementing rapid HIV testing in the ED.
Methods: We employed a mixed-methods, convergent, parallel design study including anonymous surveys and semi-structured interviews in 3 EDs in Toronto and Thunder Bay, Ontario. Survey and interview guides were developed and administered by staff trained in qualitative methods. Participants, purposefully recruited through e-mail and staff engagement, included infectious disease, laboratory and emergency physicians, nurses, and allied health. Survey data was analyzed using descriptive statistics. Themes were generated by two analysts independently in NVivo using Theoretical Domains, and the Capability, Opportunity, Motivation, and Behaviour Frameworks.
Results: Among 187 survey respondents, 150 (80.2%) felt implementing rapid HIV testing would be helpful in the ED. Facilitators included offering testing early on in patient care (41.2%) and having dedicated staff, such as those with lived experience, to provide testing (34.2%). Motivation to offer testing included the availability of resources to link patients to care for reactive results (71.7%) and the opportunity to support an underserved population (66.3%). Challenges to implementation included limited time during ED patient encounters (51.3%); negative impacts on ED workflow, beliefs about stigma as a result of testing, and a general lack of knowledge around HIV testing and consent. Interview themes confirmed those found in the survey, such as opportunities to provide education, and integration of people with lived experience in peer-based roles being essential to provide rapid HIV testing and follow-up care in the ED.
Conclusion: Implementation of rapid HIV testing in the ED is perceived to be important irrespective of practice location or profession. Intrinsic motivation to support underserved populations and provide linkage to care are novel insights to facilitate testing in the ED. Streamlined implementation including clear testing guidelines and improved access to follow-up care pathways is feasible and necessary for implementation.
Keywords: HIV testing, barriers and facilitators, qualitative research

Moderated poster

MP01

Approaches to the teaching and evaluation of trauma-informed care principles in an emergency department setting: a systematic review

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Introduction: It is estimated that 70–90% of the general population have experienced at least one potentially traumatic event in their lifetime. For some people who have experienced trauma, the experience of care in the emergency department (ED) can be triggering or even re-traumatizing. Trauma-informed care (TIC) is a framework that aims to resist the factors that may replicate or precipitate trauma. TIC is a specific approach to patient-centered care that requires intentional education and resources, which may limit its uptake in certain environments. While other specialties have successfully

integrated TIC, the nature of emergency medicine poses unique barriers to its implementation. This review synthesizes the available literature on TIC educational initiatives implemented in an ED setting.
Methods: A systematic search was conducted in January 2022. We searched peer-reviewed journals and abstracts in MEDLINE, Embase, Cochrane Database, PsycINFO, and CINAHL using a previously published search strategy. Two independent reviewers screened all abstracts and full-text articles. Data was extracted into a table and synthesized using a narrative approach. We assessed the quality of studies using the Critical Appraisal Skills Program checklists.
Results: 1941 studies were identified for screening, of which 11 were selected for final inclusion. Educational interventions included standardized patient sessions, low-fidelity skills training, didactic lectures, online modules, or a combination thereof. All studies reported positive outcomes regarding healthcare providers' knowledge of and/or comfort with TIC, including three studies that reported improvements in participants' attitudes towards TIC. Two papers reported an institutional culture change, becoming more favourable towards implementing and delivering TIC. Other outcomes included renovated patient rooms, improved interprofessional collaboration, increased referrals to a violence intervention program, and improved awareness of protocols related to human trafficking. Only one study reported a measurable change in patient outcomes- specifically, a reduction in 'code white' frequency following TIC training.
Conclusion: This review shows that appropriate educational interventions can facilitate the successful implementation of TIC in an ED context. However, further studies are needed to understand how these educational interventions impact downstream patient outcomes.
Keywords: trauma-informed care, education

MP02

Building an area of advanced learning in rural and remote transport medicine

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Innovation Concept: Despite a significant proportion of the transport of critically ill patients taking place in rural and remote areas of the country, there was not an existing formal rural and remote transport educational pathway. The goal of this educational initiative was to build an area of advanced learning in rural and remote transport with special attention to unique challenges facing healthcare providers and transport organizations in these settings.
Methods: A provincial indigenous healthcare online educational program was selected for pre-departure training. Education leads in rural and remote communities were essential in helping organize elective rotations in the local emergency department as well as associated nursing stations: Sioux Lookout, Kenora, and Moose Factory, ON. The provincial air ambulance service had a base in each aforementioned location which facilitated concurrent ride outs and education days with the paramedics. Longitudinal transport medicine shifts were organized to gain exposure to the physician role in patient transport. A critical care elective was included at the primary receiving site of the northern emergency departments and nursing stations, Thunder Bay, ON.
Curriculum, Tool or Material: The area of advanced learning consisted of several areas of focus with the goal of capturing the transport journey of a patient from a rural and remote region from all perspectives: sending site, air ambulance, intermediate receiving site, and tertiary receiving site. The primary components of the curriculum included:

1. Pre-departure preparation and training: San'yas Indigenous Cultural Safety Training Program.
2. Northern emergency department clinical work: Sioux Lookout, ON, Kenora, ON, and Moose Factory, ON.
3. Nursing station clinical work: Sandy Lake First Nation, ON and Pikangikum First Nation, ON.
4. Air ambulance ride along: Sioux Lookout, ON, Kenora, ON, Moose Factory, ON, and Thunder Bay, ON.
5. Critical care clinical work at primary receiving site of rural interfacility transfers: Thunder Bay, ON.
6. Longitudinal transport medicine physician shifts.

Conclusion: Through building local partnerships and via support of the Ornge air ambulance service, the area of advanced learning was successful in providing a well-rounded clinical and cultural educational experience. Through continued fostering of local relationships and the development of streamlined processes for logistics there is opportunity for a formal area of advanced learning to develop emergency medicine leaders in rural and remote transport.
Keywords: innovations in emergency medicine education, rural and remote medicine, area of advanced learning

MP03

Assessing integration of team cognition in Canadian emergency medicine simulation programs

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Introduction: Elements of team cognition including shared mental models (SMM) and team situational awareness (TSA) are being integrated into emergency medicine (EM) training; however, literature to date has failed to apply a consistent definition for these constructs and has yet to validate a tool for measuring team cognition in this setting. Additionally, numerous reviews have identified that research pertaining to team cognition emphasizes measuring behaviours while failing to assess elements of these constructs that contribute to those behaviours. EM programs are attempting to integrate the findings of this research into their training, but without consistent definitions or comprehensive measurement tools, are these interventions effective?
Methods: This mixed methods study samples simulation educators from EM programs across Canada (FRCPC, CCFP-EM, Pediatric EM). Participants were recruited by distributing study information via an existing network of simulation educators and to EM program directors. Data collection consisted of a Qualtrics-based self-report questionnaire paired simultaneously with a qualitative descriptive interview. Interview data was subjected to thematic analysis, while results from the questionnaire were subjected to descriptive analysis.
Results: Here we present data from six respondents to an in-progress study. Thematic analysis of interview data revealed the following themes across all responses: (1) Team cognition is important in EM simulation training, (2) Elements of team cognition are poorly defined within simulation programs and associated broadly with other terms and non-technical skills, and (3) TSA and SMM are measured through observing actions and behaviours. Survey data demonstrated that all programs incorporate team cognition and believe that its elements should be integrated into EM simulation training.
Conclusion: Preliminary results indicate that in the setting of a confounded literature base, EM programs continue to struggle with inconsistent definitions and lack objective measurement capacity as they attempt to integrate team cognition into their simulation training. Definitions of TSA and SMM are often being combined with other

non-technical skills like communication and leadership, and there has yet to be any means of evaluating these constructs apart from subjective assessments of trainee behaviours. By improving the teaching and evaluation of team cognition, we can more effectively prepare trainees and ultimately improve performance in a team setting.
Keywords: team cognition, simulation, education

MP04

Freely given, but at what cost? A qualitative study on the benefits and costs to creators and producers of free open access medical education

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Introduction: The free open access medical education (FOAM) movement has generated many educational resources for both teachers and learners to use for asynchronous learning, on-shift education, and journal clubs. However, while FOAM remains free to end-users, the burden of production and cost of maintenance has largely fallen on the producers of FOAM resources. This work has frequently relied upon unpaid and unfunded time of creators, contributors, and producers.
Methods: The authors conducted a qualitative, interview-based study, situated within a constructivist and interpretivist paradigm. Leaders of Emergency Medicine FOAM outlets (e.g. blogs and podcasts) from the top 25 sites within the Social Media Index were invited to participate (1). One-on-one interviews were conducted and the audio was transcribed verbatim by a trained medical transcriptionist. Transcripts were then analyzed by a team of four via interpretive description methodology (2).
Results: Eleven FOAM website administrators, aged 35–63, were interviewed for this study. Interviews lasted between 14 and 48 min, yielding 125 pages of transcripts. We reached theoretical sufficiency with these 11 participants around our selected themes. Participants described many benefits of their FOAM involvement, including driving their own learning, personal satisfaction, and career growth. However, there were also significant obstacles and costs that hindered the sustainability of FOAM content creation, including monetary costs of maintaining the outlets, opportunity costs (e.g. time away from family), and increasing pressure to produce.
Conclusion: FOAM is not free to those who create it. While there are some advantages, there are also some clear pain points that may impact on the long-term sustainability of the movement. Going forward, local or national organizations may need to consider how they might support FOAM by supplying funding or human resources.
Keyword: free open access medical education

MP05

Causes, harms, and measures of global emergency department overcrowding: an overview of reviews

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Introduction: Overcrowding in emergency departments presents a global public health concern. Concerns related to overcrowding include poorer patient outcomes, healthcare staff burnout, and the potential to worsen illness transmission, which was particularly prevalent in light of the COVID 19 pandemic. Causes of overcrowding and literature sorting is generally divided into three bins: input, throughput, and output. There is global literature related to the causes, measures, and harms of overcrowding related to each of the bins, however a synthesis of the current state of the literature does not currently exist. This overview of reviews aimed to review the current state of the literature of crowding in the emergency department, related to each stage of care.
Methods: Evidence was compiled from systematic reviews that assessed factors that cause ED overcrowding, appraised the measures of overcrowding, and analyzed the outcomes and harms related to overcrowding. The methodology was supported by the current PRIOR statement for overviews of reviews. A health sciences librarian with experience in systematic reviews searched MEDLINE and Embase on the Ovid platform for subject headings and keywords related to the concepts of Emergency Department and overcrowding. A subsequent screening process narrowed down to 13 articles which addressed the causes, harms, and measures of emergency department crowding. Article evaluation and extraction were performed to support a narrative synthesis.
Results: The authors found many metrics of overcrowding are available to quantify the causes and harms of emergency room crowding, which can be effectively applied to investigate the exact causes and harms of emergency room crowding. A number of patient and healthcare system-related causes were identified. These include specific patient-related factors, and system-related factors, which can be mediated by interventions targeting all three aspects of emergency room care but must be mediated by clinical practice guidelines.
Conclusion: The current state of overcrowding research concludes that the most prevalent cause of global overcrowding is related to output measures, particularly emergency department boarding. However, there are a number of causative factors which can be targeted to prevent harmful outcomes to patients, healthcare staff, and the healthcare system at large. These will continue to be explored by using effective flow metrics of emergency room functioning and crowding, which have been validated by multiple studies.
Keywords: overcrowding, causes, measures and harms

MP06

The effect of Epic electronic health record implementation on burnout in emergency providers

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Introduction: Emergency providers are at particularly high risk for burnout, a work-related stress syndrome. Burnout syndrome is characterized by emotional exhaustion (EE), depersonalization (DP), and lack of personal accomplishment (PA). These domains are combined to create the Maslach Burnout Inventory. The Maslach Burnout Inventory Human Services Survey, adapted for Medical Personnel (MBI-HSS-MP), is a validated tool commonly used to evaluate burnout syndrome in health care providers. There is emerging evidence that poor electronic health record (EHR) implementation is associated with professional dissatisfaction leading to burnout. Furthermore, EHR functions such as copy/paste and auto-population contribute to *note bloat*, a colloquial term used to describe unnecessary and often redundant information in patient charts. In this study, we examine the presence of burnout by administering the MBI-HSS-MP before and after implementation of Epic EHR. Note bloat was evaluated by total character counts of emergency provider charts as a secondary outcome of the study.
Methods: Analysis of sequential cross-sectional data obtained from surveys administered electronically to staff physicians, nurses, nurse practitioners, and physician assistants at the University Health Network emergency departments. Surveys were administered 2 months

before and 3 months after Epic implementation and average scores for EE, DP, and PA domains of the MBI-HSS-MP were calculated. 30 notes were randomly sampled prior to the implementation of Epic and character counts were extracted and averaged. Character counts from all 39303 notes from June 5, 2022 to Oct 1, 2022 written by emergency physicians, after the implementation of Epic, were averaged.
Results: There were 86 respondents in the pre-implementation arm of the study, 38 physicians (45%), 45 nurses (53%) and 3 nurse practitioners/physician assistants (2%). The average EE, DP, and PA domain scores were 3.72, 2.79, and 4.32, respectively. There were 64 respondents in the post-implementation arm of the study, 25 physicians (39%), 35 nurses (55%), 4 nurse practitioners/physician assistants (6%). The average EE, DP, and PA domain scores were 3.81, 3.13, and 4.45, respectively. The average character counts before and after Epic implementation were 2092 and 1981, respectively.
Conclusion: There is no statistical significance between the EE, DP, and PA domain scores or the presence of note bloat, before and after implementation of Epic.
Keywords: burnout syndrome, electronic health record, note bloat

MP07

The COVID-19 lockdown: a survey of Canadian emergency physicians' perspectives

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Introduction: Emergency physicians have been working at the frontlines of a pandemic that has lasted much longer than many anticipated, prompting an unprecedented number of emergency physicians to leave the specialty due to burnout. The aim of this study was to explore the most challenging aspects of lockdown during the pandemic for Canadian emergency physicians in winter 2020–21, with a focus on mental health.
Methods: We started a national wellness survey of Canadian emergency physicians in April 2020. Participants were invited in winter 2020–21 to participate in a confidential follow-up survey which included 12 open-ended, free text questions about their experiences of working during the pandemic. We analyzed a single question in the survey, which read "What has been the hardest thing for you (either personally or professionally) during the lockdown?" Analysis of participants' responses were performed in Dedoose (Manhattan Beach, CA, USA). Survey responses were assigned codes, which were grouped into key themes using Thorne's interpretive description approach, sensitized by the concept of personal wellness. We compared thematic patterns between (1) genders, (2) age (physicians aged $\geq$ 45 versus $<$ 45), and (3) stage of training (staff versus residents).
Results: 400 Canadian emergency physicians completed the survey. Analysis yielded 945 codes which were applied to 6986 excerpts. 149 of these codes applied the question about lockdown. The codes for this question were organized into three major themes, (1) cost to self and mental health, (2) challenges of the job and (3) lack of support, with 14 subthemes. Men and women physicians reported similar distress from isolation, fear of contracting COVID and fatigue. Women cited dealing with family as the worst experience in lockdown more often than men. Younger physicians reported isolation, particularly, loss of usual outlets to relieve stress and loss of their family connection more often than older physicians. Younger physicians more often reported fatigue as the hardest thing they experienced during lockdown. Staff physicians reported lack of support and dealing with logistical challenges more often than residents.
Conclusion: During the COVID-19 pandemic, Canadian emergency physicians experienced distress from the personal toll on their lives. Although some experiences were partially explained by physician gender, age and stage of training, most adversity was experienced similarly across physicians.
Keywords: mental health, burnout, pandemic

MP08

Recommendation-making in the emergency department: a qualitative study of how Canadian emergency physicians guide treatment decisions in critically ill patients

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Introduction: Emergency physicians are frequently responsible for making time sensitive decisions around the provision of life-sustaining treatment. These decisions can involve a goals of care or code status discussion, which will often substantially alter a patient's care pathway. A central part of these conversations that has received relatively little attention are recommendations for care. By proposing a best course of action or treatment via a recommendation, a clinician can ensure that their patients receive care that is concordant with their values. It is essential to improve our understanding of how physicians think about recommendations and view their role in recommendation-making.
Methods: We recruited Canadian emergency physicians via multiple recruitment strategies to ensure maximum variation sampling. Semi-structured qualitative interviews were conducted until thematic saturation occurred. Participants were asked about their perspectives and experiences with respect to recommendation-making in critically ill patients, and to identify areas for improvement in this process in the ED. We used a qualitative descriptive approach and thematic analysis to identify themes around recommendation-making in the emergency department for critically ill patients.
Results: Sixteen emergency physicians agreed to participate. We identified four themes and multiple subthemes. Major themes included (1) identification of the roles and responsibilities of the emergency physician with respect to making a recommendation, (2) the logistics or process of making a recommendation, (3) barriers to making a recommendation, and (4) how to improve recommendation-making and goals of care conversations in the ED.
Conclusion: Emergency physicians provided a range of perspectives on the role of recommendation-making in critically ill patients in the ED. Several barriers to the inclusion of a recommendation were identified and many physicians provided ideas on how to improve goals of care conversations, the recommendation-making process, and ensure that critically ill patients receive care that is concordant with their values.
Keywords: goals of care conversations, decision-making, resuscitation decision making

MP09

An educational needs assessment for the toxicology modules of an emergency medicine training program at Addis Ababa University

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Introduction: The Toronto Addis Ababa Academic Collaboration (TAAAC) in Emergency Medicine (EM) is a bi-institutional

partnership between the University of Toronto (UofT) and Addis Ababa University (AAU) focused on addressing the need for EM postgraduate training and care in Ethiopia.
Since toxicology is a key competency in EM training, the goal of this project was to conduct an educational needs assessment to inform the development of a context-specific toxicology curriculum for the AAU EM training program.
Methods: The needs assessment consisted of a survey and face-to-face interviews conducted with Ethiopian EM faculty and current AAU EM residents. The survey was distributed over the month of October 2018 and the interviews were conducted in November 2018. Quantitative survey data was analyzed using descriptive statistics, and qualitative content analysis of open-ended survey data and interview data, directed by a literature review and in-country experience, was performed. The resulting itemized lists and themes were independently coded by two researchers. The survey results were used to identify perceived learning needs, while the interviews were used to identify expressed learning needs of EM trainees in the subject area of toxicology.
Results: There were 11 interviews completed with AAU EM faculty and residents. The survey response rate was low at 27%. Thematic analysis was subdivided into system-related, provider-related and patient-related themes. Analysis of the survey data and interview data revealed that educational training in toxicology is well-received, however, perceived and expressed needs included additional coverage of common local toxicological presentations (i.e. pesticides, caustics, barbiturates) as well as practical issues in ED management of toxicological presentations (i.e. limited resources, lack of antidotes, limited dialysis and laboratory capabilities, and delayed presentations).
Conclusion: There is a fine balance in education between the prescribed need to teach optimal, evidence-based care, and the perceived and expressed needs in a low-resourced medical environment.
Since the project's inception, there has been increased attention to poisoning as a public health concern in Ethiopia, which led to the establishment of a new national Toxicology Centre in Addis Ababa. As a next step, we plan to analyze data from the Toxicology Centre to provide additional information on unperceived needs in toxicology training in Ethiopia.
Keywords: postgraduate training, toxicology

MP10

Leveraging influence: a social network approach to explore dissemination of evidence-based practice interventions amongst paramedics.

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Introduction: Achieving practice change in healthcare is often a daunting task. Just as the evolving evidence base in medicine necessitates strategies to facilitate change, the colleagues who constitute a practitioner's informal peer network likely shape how they respond to education initiatives and changes to practice promoted both within the organization and throughout the professional community. The purpose of the current study was to consider the extent to which the composition of peer networks predict paramedics' attitudes toward key issues relating to practice change – namely, attitudes toward emerging evidence in airway management and attitudes regarding continuing medical education.
Methods: Ontario paramedics from one organization (99 participants; 49.5% female; 25% Advanced care paramedic) completed an online survey with self-report items regarding beliefs surrounding advanced airway management and the need for increased continuing medical education. This questionnaire also included items to nominate up to ten peers who participants viewed as sources of mentorship or support. Bivariate correlations and linear regressions examined associations between personal attitudes, and the average attitudes held by peers nominated by the participant. Follow-up ego network figures were constructed to further demonstrate four unique forms of personal network structures.
Results: Descriptive characteristics of participant networks were related to key attitude items (e.g., the number of mentors nominated was correlated with beliefs about emerging evidence, $r = 0.21$); however, there were no significant associations between paramedics' own attitudes and the average attitudes of their peers. Follow-up ego network figures illustrated unique network configurations, which may be sources of heterogeneity relating to the present analyses.
Conclusion: This social network research links aspects of personal mentorship and support networks with attitudes toward emerging evidence but did not identify an association between average peer beliefs and self-beliefs. This study presents a novel use of ego-centric network analysis, but novel sampling or analysis approaches may be required to further leverage network data to understand healthcare worker beliefs about practice.
Keywords: network analysis, paramedic, peer influence

MP11

Best practices for the care of the ventilated patient in the emergency department: a scoping review.

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Introduction: Practices such as lung protective ventilation and appropriate sedation reduce complications associated with mechanical ventilation and are standard of care in the intensive care unit (ICU). These practices are not universally applied to ventilated patients in the emergency department (ED). As patients often spend significant time boarded in the ED it is plausible that initiation of these interventions in the ED may improve outcomes. However, it is likely that not all ICU practices can be initiated in the ED setting. The objective of this review was to identify which interventions may be applicable in the ED.
Methods: We conducted a scoping review of the literature to assess best practices for mechanically ventilated patients in the ED. Searches were completed of MEDLINE, EMBASE, CINAHL and all EBM databases for English-language studies published from inception until 2021. Our search strategy was tailored to determine the evidence around the application of best practices in the ED and within the first 24 h of care of the ventilated patient. Review and screening was performed by two independent reviewers, with disagreements resolved by consensus. Data relating to study design, location, population, intervention, and outcomes were extracted on a standard template.
Results: We identified 2600 studies, of which 80 underwent full-text review. A total of 17 studies representing 13,216 patients met inclusion criteria. The majority were observational (13/17) and conducted in the United States (12/17). Identified studies focused on three key themes: ventilator management (10), analgesia/sedation (4) and

hemodynamic monitoring and support (3). The most common interventions were initiation of lung-protective ventilation (8) and targeted sedation (3). Higher than recommended tidal volumes, deep sedation, and post-intubation hypotension were common in ED patients, and associated with worse outcomes including increased mortality and ICU length of stay.
Conclusion: Evidence suggests that early attention to ventilator management, analgo-sedation, and hemodynamic support and monitoring in ventilated patients affects outcomes. However, the correlational design of the majority of included studies limits the strength of our findings. These results should encourage work to improve the ED management of ventilated patients. Future endeavors should focus on assessing and optimizing tidal volumes, sedation and BP management in the ED to potentially improve outcomes for ventilated patients in the ED.
Keywords: critical care, emergency department, mechanical ventilation

MP12

Point-of-care ultrasound to identify a carotid pulse: a pilot study in paramedics

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Introduction: Point-of-care ultrasound (POCUS) is an invaluable tool that assists clinicians in making rapid and accurate diagnoses that guide management in real-time. Recent studies have established the utility of POCUS in identifying a carotid pulse, demonstrating higher first attempt success rates with a similar time to detection compared to manual pulse checks. Advanced cardiac life support (ACLS) guidelines support the use of POCUS in cardiac arrest patients, yet paramedics often do not receive formal training, nor have access to POCUS when responding to cardiac arrests. Thus, we aim to test whether paramedics can be effectively trained to identify a carotid pulse using POCUS.
Methods: Advanced-care paramedics with no formal ultrasound experience were given a brief online training video outlining basic ultrasound techniques. Subsequently, participants attended a 2-h in-person training course where they learned practical skills required to identify a carotid pulse on live volunteers. Each participant then completed a visual and practical exam. The visual exam assessed participants' ability to recognize the presence or absence of a carotid pulse from a series of pre-recorded videos. A score of $\geq 80\%$ was considered a pass. The practical exam assessed participants' ability to independently generate and identify POCUS images of carotid pulses on randomly assigned healthy volunteers. Participants were timed, in seconds (s), to assess how rapidly they could complete this task.
Results: 29 advanced-care paramedics were enrolled in the study and successfully completed the online and in-person training courses. For the practical exam, the carotid pulse was accurately identified without errors in 115/116 (99.2%) attempts, with a mean time of 5.12s (SD 3.47), and with 107/116 (92.2%) attempts being < 10s. There was no significant difference ($p = 0.07$) in mean times between portable (5.53s $\pm$ SD 3.90), and nonportable devices (4.73s $\pm$ SD 3.01). 24/29 (82.8%) participants passed the visual exam with a score $\geq 80\%$.
Conclusion: This study demonstrates that paramedics with no formal ultrasound experience can be trained within 2 h to use POCUS to rapidly and accurately identify a carotid pulse. These results highlight the need for future research aimed at studying the utility of POCUS in the pre-hospital setting. POCUS is being increasingly utilized in-hospital to guide cardiac arrest care, yet remains absent in the pre-hospital setting where the majority of cardiac arrests occur.
Keywords: innovations in emergency medicine education, point of care ultrasound, emergency medical services

MP13

Family perspectives on the impact of child life specialists during pediatric emergency department visits

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Introduction: Children in the emergency department (ED) frequently experience pain and distress. Child life specialists (CLS) aim to promote child well-being and minimize adverse experiences during healthcare visits. We aimed to describe caregiver perceptions of their ED experience with and without CLS involvement in their family's care. Secondary objectives included describing children's ED visit experiences and better defining specific areas of CLS involvement in the ED setting.
Methods: We performed a descriptive cross-sectional survey of caregivers of children aged 0–17 years, children > 7 years old and CLSs at the Stollery Children's Hospital ED from March to August 2021. Using Burns et al methodology, 3 novel surveys (caregiver, child and CLS) were created with multidisciplinary expert panel input and patient and family partner guidance. Surveys were distributed by research assistants in the ED via paper, an electronic tablet or a link provided to caregiver email.
Results: 179 caregivers (mean age 38.9 years $\pm$ 8.4) of children (mean age 7.0 years $\pm$ 4.5) participated in the survey; 57 children completed their own survey. Caregivers' overall ED experience was better with CLS involvement vs. without, with more caregivers in the CLS+ group rating their experience as "the best" (57.6% 34/61) vs. those in the CLS- group (37.7% 40/115) ($p = 0.02$). Caregivers' overall satisfaction with the ED experience was significantly better with CLS involvement vs. without, as more caregivers rated their satisfaction as "extremely satisfied" in the CLS+ group (79.7% 47/61) vs. the CLS- group (56.6% 60/115) ($p = 0.01$). 98.4% (60/61) of caregivers reported that CLSs made the visit better/much better and 100% of children ($n = 11$) reported that CLS were helpful/very helpful. Children who had CLSs involved in their care were significantly more likely to be offered non-pharmacologic interventions than those without CLS involvement ($p = 0.003$); they were also more likely to have a healthcare worker explore their feelings, fears or anxieties ($p = 0.001$), help them prepare for a procedure/physical exam ($p < 0.0001$), provide distraction techniques ($p < 0.0001$), offer strategies to help them cope ($p < 0.0001$) or provide play opportunities ($p < 0.0001$).
Conclusion: We found that CLS involvement positively impacts caregiver experiences and satisfaction in the ED and increases the likelihood of children receiving interventions that are known to improve family healthcare experiences.
Keywords: experience, children, satisfaction

MP14

Qualitative analysis of telemedicine and virtual healthcare for sexual assault and intimate partner violence survivors

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Introduction: Sexual assault and intimate partner violence (SA/IPV) survivors are vulnerable patients often lost in the healthcare system. SA/IPV survivors have complex medical and social concerns making it essential they return for continued care following their initial presentation to the emergency department (ED). The Ottawa Hospital (TOH) piloted a telemedicine program to improve longitudinal care

for this population. The study objectives are to evaluate the feasibility, acceptability, and satisfaction of using telemedicine technology among SA/IPV patients at TOH.
Methods: Patients were identified from the Sexual Assault and Partner Abuse Care Program (SAPACP) case registry (April 1, 2020 to March 31, 2022) in the ED at TOH. Qualitative trauma-informed interviews were conducted individually with consenting patients and transcribed verbatim. Transcripts were manually verified by investigators. Qualitative data analyses were performed using NVivo Software to evaluate feasibility and acceptability of telemedicine use among patients and investigate barriers and drivers of telemedicine use via narrative analysis.
Results: In the study timeframe, 1007 patients were seen by SAPACP, 180 (8%) consented to research contact, and 14 out of 180 (8%) patients agreed to participate in an interview. All patients were biological females, 4 (29%) were below 24 years of age, 10 (71%) experienced sexual assault, and 7 (70%) expressed preference for telemedicine follow-up. Telemedicine was deemed to be feasible and acceptable among patients based on ease of use of telemedicine technology, feelings of safety during the appointment, high satisfaction with services provided, and a positive attitude towards future use. Three themes emerged that reveal barriers to telemedicine: (1) lack of privacy from others, as a result of living with roommates, (2) lack of safety from assailant, who monitored their every move when at home, and (3) pressure to balance competing tasks during the appointment. Three themes emerged that reveal drivers to telemedicine: (1) increased comfort, as survivors felt safe in their own space, (2) increased convenience, as survivors were not required to leave their safe space, and (3) less time required for the appointment.
Conclusion: While the use of telemedicine technology for SA/IPV survivor follow-up care is feasible, acceptable, and can improve patient satisfaction for many, safety and privacy are key considerations for this specialized follow-up.
Keywords: sexual assault, telemedicine

MP15

Computed tomography evaluation of clinical scaphoid fractures in the emergency department: a quality improvement study

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Introduction: Scaphoid fractures are a common injury presenting to the Emergency Department (ED) and can be difficult to identify, as they are often not visible on x-ray. A scaphoid fracture not immobilized is at high risk of avascular necrosis, leading to chronic wrist pain and dysfunction. Gold standard tests for diagnosis of these fractures are MRI and bone scan. Alternatively, repeat x-rays have been shown to have adequate sensitivity. CT scans have been found to have poor sensitivity for scaphoid fracture, however, at our centre it remains common practice to perform CT and, if negative, the patient is discharged to perform wrist and hand activities as tolerated. This study's objective was to determine the proportion of CT scans resulting in potential missed scaphoid fracture in order to provide evidence for practice change.
Methods: A retrospective chart review of all adult (18+ years) hand/wrist CT scans performed at two tertiary care EDs from 2017 to 2018 was performed to identify how many occult scaphoid fractures were detected versus "ruled out". We further reviewed patients with a "ruled out" scaphoid fracture to determine if the patient sought further care for their wrist injury in the following 3 years. The primary outcome was evidence of missed scaphoid fracture from ED re-presentation, clinic visits and/or subsequent imaging. Additional data collected included demographics and investigations performed. Patients residing outside of the hospital catchment area were excluded. Results were summarized using proportions with 95% confidence intervals as appropriate.
Results: 183 CT wrists were completed in the timeframe with 145 performed to rule out potential scaphoid fracture. 49% of patients were male, 51% female. 17 (11.7%) CT's identified scaphoid fractures. Of the 128 CTs with no evidence of scaphoid fracture 1/128 (0.78%) (95% CI 0.02–4.28%) had a missed scaphoid fracture on the original CT.
Conclusion: Literature surrounding the use of CTs is clear that the sensitivity of CT scan to rule out scaphoid fracture is unacceptably low with a high miss rate. Although our study demonstrated a miss rate of 0.78% (95% CI 0.02–4.28%), the CI is wide and overlaps with previous literature. Further research will include surveying similar centres to determine practices across the country as well as quality improvement initiatives to adopt new diagnosis practices such as serial x-rays in order to ensure the most robust methods are being utilized at our centre.
Keywords: scaphoid fracture, CT, quality improvement and patient safety

MP16

Sim from home: development and evaluation of hybrid virtual and in-situ simulation sessions

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Innovation Concept: Simulation-based medical education (SBME) has become a cornerstone of healthcare training, but COVID-19 physical distancing guidelines led many simulation programs to rapidly shift from in-person to virtual or hybrid offerings (combined virtual and in-person). We created regular hybrid in-situ simulation (HISS) rounds whereby participants could observe via Zoom and participate virtually during the debriefing. The objective of this initiative was to explore Emergency Department (ED) staff experiences, barriers and opportunities with hybrid simulation rounds.
Methods: An interprofessional team of clinician educators and simulation specialists designed a survey using a combination of Likert, multiple choice, and free-text questions. We pilot tested the survey for comprehension and usability among a multi-disciplinary group of 4 ED staff. All ED physicians, nurses and allied health staff from a single academic centre were invited to participate. Paper surveys were distributed in person across a number of days and shifts to increase sampling diversity. Descriptive statistics were used to analyze results. We conducted a thematic analysis of the free text comments.
Curriculum, Tool or Material: Seventy nine out of one hundred and fifty-three ED staff completed the survey (52% response rate). Of those who participated in simulation, 88% participated in-person and 20% participated virtually. Among respondents who participated in both in-person and virtual simulation ($n = 15$, 30%), the majority ($n = 12$, 80%) preferred in-person participation. However, participants frequently ($n = 9$, 69%) reported the benefit of convenience of virtual sessions when they could not attend in person. No participants indicated that risk of COVID-19 transmission impacted their desire to participate virtually. Most respondents ($n = 60$, 76%) indicated they would watch a simulation session recording made available at a later date.
Conclusion: Our findings suggest that most ED staff preferred in person over virtual simulation sessions. Hybrid simulation, however, provides a complementary option that may increase participation rates. Reported interest in watching recorded simulation sessions asynchronously challenges the long held practice to keep simulation unrecorded. Further investigation is required to understand the impact

of such recordings on participants feeling psychologically safe during the sessions.
Keywords: innovations in emergency medicine education, simulation, virtual education

MP17

Rapid educational response to an emergency department code silver event

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Innovation Concept: There has been a higher prevalence of hospital-related shooting incidents in Canada. Current literature recommends the "run-hide-fight" method, and many hospitals have policies based on this to respond to a shooting. Hospital policies can be lengthy and vague, failing to include specific department recommendations. A recent code silver at our emergency department (ED) highlighted these limitations, necessitating a rapid educational intervention. To address this gap, we created evidence-based code silver educational material with the aim of providing ED staff with practical advice in a timely manner.
Methods: An initial meeting took place with relevant stakeholders which determined: (1) a literature review was needed for evidence-based educational interventions, (2) ED's required walk-throughs; and (3) the development of educational material was needed. A literature review was performed, and 26 journal articles were evaluated. We found one evidence-based preparedness strategy for a code silver response that was feasible to implement with minimal resources rapidly – Kim et al. visualization practice. We then conducted walk-throughs of the ED to determine how human factors may influence the implementation of our code silver policy and to gather environmental awareness. Through the combination of our institutional policy, literature review, and environmental analysis we developed a strategic 5–7 min email and disseminated it to ED staff.
Curriculum, Tool or Material: There are four parts to the code-silver tool. Part 1 is knowledge sharing where the hospital code silver policy and poster are included. Part 2 provides specific considerations in applying the policy in our ED including where one could run or hide i.e., what doors require key cards, what rooms lock, and considerations such as lead lining in the x-ray room. Part 3 is a deliberate mental rehearsal where a scenario is used as a focus to which participants are asked to visualize exactly what they would do in response. Lastly, Part 4 crowdsources recommendations to include in the next iteration of the code silver policy or tips not included in our tool.
Conclusion: The code silver tool is a rapidly developed low-resource requirement tool that has the potential to impact staff comfort and safety in the setting of an active shooter. This tool was specific to code silver, however, the methodology and structure used are now being applied to other institutional codes such as code purple and code brown.
Keywords: innovations in emergency medicine education, code silver response, shooting

MP18

ExpandED: the GridlockED game expansion pack

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Innovation Concept: Developed in 2017, GridlockED is a serious game that aims to teach trainees about the basics of emergency department flow. Across an 8 hour shift, players deploy pre-assigned ED professionals (ED physicians, residents, nurses, consultants and radiologists) across different acuity zones to treat patients presenting with a variety of illnesses. The emergency department is a highly interprofessional unit, and as such interprofessional education (IPE) is valuable in providing students with the knowledge and skills to work together as a team. We sought to develop an expansion pack for GridlockED which would better represent the interprofessional nature of the ED.
Methods: Through an iterative design process, a team of four medical students and one attending physician designed an expansion pack for the GridlockED game. Adopting the IDEO design thinking framework, the team sought to *empathize* with GridlockED players from professions that were not yet included in GridlockED, *defined* the limits of the expansion, *ideated* to develop new designs and ideas, *prototyped* to gain insights into playability, and *tested* the game internally within the team.
Curriculum, Tool or Material: ExpandED is an expansion pack that builds upon classic GridlockED to provide an enhanced, interprofessional experience that increases the complexity of the gameplay, allowing players to "hire" their ideal team. It adds one crucial pre-game play step, the "boardroom" phase where players must decide how they would like to staff their ED, from a more expansive team of healthcare providers (see below for listing). They can then also select from various templates that increase the difficulty of the game, before continuing to gameplay.
While each game of ExpandED starts with an ED doctor, EM resident, radiologist and consultant, the players also start with a certain number of points to hire the rest of their staff depending on the difficulty level they select. ExpandED allows players to select from ER doctors, additional residents (both EM and consulting), NP, PA, RNs, RPNs, a POCUS fellow, RT, mobility team (OT/PT), and a paramedic. The expansion pack also includes new patient scenarios, event cards, and two new clinical spaces. It also provides advanced turn counters with increased card draws and an 8-sided die.
Conclusion: ExpandED is the first GridlockED game expansion pack. Next steps include determining the efficacy of ExpandED as a teaching tool for IPE.
Keywords: innovations in emergency medicine, serious game, simulation

MP19

Development, implementation and evaluation of a novel quality improvement and patient safety curriculum in an emergency medicine residency training program

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Innovation Concept: Proficiency in Quality Improvement and Patient Safety (QIPS) methodologies have been identified as a standard of residency training in the Royal College of Physicians and Surgeons Canadian Medical Education Directives for Specialists. Emergency Medicine (EM) program directors and residents alike have indicated a desire for formal QIPS training in residency education but there is no established standard on how best to achieve the requisite competencies. We sought to develop, implement and evaluate a QIPS curriculum in an EM residency training program.
Methods: We used Kern's model of curriculum development to guide the creation of a QIPS curriculum for transition to practice (TTP)

residents and faculty members in the University of Saskatchewan's Department of EM. Semi-structured qualitative focus groups were held, with QIPS involved faculty and EM residents as participants, to understand desirable and feasible learning outcomes from the perspectives of both groups. A subsequent curriculum mapping session was held between a local QIPS expert and residency program leadership to map assessment strategies to learning objectives. The curriculum was subsequently formulated in accordance with previously published best practice recommendations for QIPS curricula.
Curriculum, Tool or Material: Using the themes identified from the semi-structured interviews, a hybrid didactic and experiential QIPS curriculum was created which was spread across pre-readings, assignments, and two live sessions. During the second live session participants received a lecture from an invited QIPS expert. Program evaluation took the form of a pre- and post-curriculum survey with Likert-style questions designed in accordance with the reaction and learning levels of the Kirkpatrick evaluation model. QI knowledge acquisition was evaluated through the Quality Improvement Knowledge Acquisition Tool – Revised (QIKAT-R). To assess for the behavior change level of Kirkpatrick's model, we will send a third survey to the participants one year after the curriculum.
Conclusion: We delivered this curriculum to four TTP residents and two faculty members. All participants felt that they had developed the necessary skills to participate in QIPS work and demonstrated improved knowledge ratings on individual QIPS competencies after the curriculum. 83.3% of participants indicated a desire to participate in QIPS activities in the future. QIKAT-R scores similarly improved after the curriculum, demonstrating objective evidence of knowledge acquisition.
Keywords: innovations in emergency medicine education, quality improvement, patient safety

MP20

Prez Drillz for medical students: an online workshop to practice oral case presentation skills and improve through self, peer, and facilitator feedback

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Innovation Concept: Presenting clinical cases orally is a core skill for medical students—a potentially intimidating task. Oral case presentations may influence preceptors' impression of students, as it highlights learners' cognitive and non-cognitive attributes. University of Calgary medical students identified low confidence in presenting cases and desired more practice. We created a workshop, "Prez Drillz", to address this. Literature has established simulation as an effective learning tool; providing an online simulated presentation opportunity allows students to practice and receive peer and facilitator feedback prior to presenting real cases in clinical rotations. The online format also makes the learning session accessible and eliminates the need to book spaces for large student numbers.
Methods: Before the workshop, students viewed a podcast on presentation structure. 157 second-year students participated in the 2.5-h session containing simulated presentations to preceptors, hosted via Zoom videoconferencing, with 1 preceptor for 4–5 medical students. Students ($N = 23$) completed a retrospective survey on their agreement (1 = strongly disagree; 5 = strongly agree) with self-efficacy statements regarding presentation skills pre- vs post-workshop (effective frame/context, clear history/physical exam, convincing top differential diagnoses, comprehensive management plan, appropriate confidence, clear/effective communication, organized/structured approach).
Curriculum, Tool or Material: In the workshop, students first listened to a 5-min case audio, outlining patient history and examination findings. Students delivered an oral case presentation, based on information extracted. Self-reflection and feedback from peers and preceptor followed. Students then practiced delivering a second presentation by implementing feedback received.
Conclusion: All self-efficacy ratings increased with statistical significance ($p < 0.001$) and large effect size; average self-efficacy rating was 2.50/5 pre-workshop versus 4.32/5 post-workshop. Average workshop rating ($N = 55$) was 4.73/5. This workshop improved students' self-efficacy in oral case presentation skills. Peer-teaching, repetition, and feedback opportunity aided learner success. Preceptors may be less familiar with certain case content; therefore, a guide with example management plans was provided. Educators can adapt this curriculum model to help learners with oral case presentation skills, especially in emergency medicine where concise but thorough presentations help formulate decisions.
Keywords: innovations in emergency medicine education, undergraduate medical education, oral case presentation

MP21

Feasibility of a longitudinal interprofessional simulation-based training program for in hospital cardiac arrest

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Innovation Concept: As healthcare teams move away from physician-lead to team-based decision making, an increased need for collaborative interprofessional training has been required. Interprofessional simulation is one method to improve this collaborative model. Our institution tested the longitudinal feasibility of implementing interprofessional simulation-based training for members of the Advanced Code Blue health care team, to ultimately improve team efficacy and create a sustainable training program.
Methods: The study utilizes a mixed methodology, longitudinal approach. Physicians, medical residents, registered nurses, and registered respiratory therapists were recruited through convenience sampling from our institution. Inclusion criteria was licensure in the above-mentioned professions and employment in a critical care area. As of this submission 73 participants have taken part in the project. Quantitative measurement includes chest compression fraction, a TEAMS survey, and a project specific Likert scale questionnaire. Feasibility was measured via attendance, cancellations, participant survey, and an organizer evaluation form following each simulation. Participants were recruited monthly. Control cases are run every 4 months for measurement of data and tracking of impact.
Curriculum, Tool or Material: The curriculum for interprofessional training is based on monthly simulation-based training sessions. For each session, practitioners are recruited to take part in a 1 -hour session. During this session they cover the pre-brief to simulation, simulation case introduction, practicing of roles and responsibilities during the simulation case, and a thorough debrief of the simulation case. Every 3 months a new scenario is introduced which highlights different aspects of working in an interprofessional team during a cardiac arrest. The goal of this is not to teach cardiac arrest care but to improve team-reflection and introspection which improves the learner's function within the interprofessional role.
Conclusion: The aim of this project was to answer whether is it feasible to create and implement an interprofessional simulation-based training program at our institution. From our preliminary results at our facility, it appears it is possible. Though the research associated with the project is still ongoing, the combination of promising early

results and positive feedback from participants have shown the feasibility and utility of such projects.
Keywords: simulation, interprofessional education

MP22

Implementation of simulation-based educational models to improve learner preparedness in social medicine

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Innovation Concept: Is simulation-based teaching (SBT) more effective than traditional medical curricula in preparing learners to address social disparities and injustices in clinical settings?
Methods: Four simulation scenarios informed by the literature, clinical exposure, and identified curricular gaps were developed and then reviewed by the Equity, Diversity, and Inclusion portfolio and clinical faculty at NOSM University. Small groups of pre-clerkship medical students participated in each simulation for 10 minutes, followed by debriefing. Participants ($n = 22$) completed a pre- and post-simulation survey evaluating their preparedness to address Social Medicine (SM) topics in practice.
Curriculum, Tool or Material: Our four SM simulations demonstrate how to integrate SM into SBT in emergency medicine curricula.

1. Patient presents with chest pain and refuses investigations due to mistrust of the healthcare system following previous experiences of racism. Case purpose: acknowledge patient's previous experiences; provide care in a responsive and culturally safe manner.
2. Patient presents with an accompanier and demonstrates red flags of human trafficking and intimate partner violence. Case purpose: identify red flags in a clinical setting; develop strategies to conduct a safety interview privately.
3. Patient is an unhoused individual presenting with frostbite and an underlying substance use disorder. Case purpose: identification and provision of social supports.
4. Patient living in a refugee camp presents with a new onset of fever, diarrhea, and weakness. Case purpose: workup a hypovolemic patient in a resource-limited setting; consider contribution of social and environmental factors to illness.

Conclusion: The Global Health SimSeries aimed to increase pre-clerkship medical students' preparedness to provide equitable and inclusive care to marginalized populations. SBT effectively prepares medical trainees to respond more effectively in clinical scenarios; however, more data is needed to demonstrate the utilization of SBT in developing SM competencies in Canadian medical curricula. Pre-simulations, only 5.9% of learners identified preparedness to address SM concerns in clinical settings. After participating in SBT, 71.4% of students endorsed that they felt better prepared to address these topics. Here we demonstrate the value of SBT in developing learner competence in addressing SM topics in emergent care settings and the opportunity for integration of SM SBT into emergency residency curricula.
Keywords: innovations in emergency medicine education, simulation, social medicine

MP23

Using audit and feedback to improve quality of care in an academic emergency department

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Background and Aim Statement: Physician audit and feedback (AF) provides emergency physicians (EP) with a summary of clinical performance data compared to their peers over time. AF is a quality improvement tool in emergency departments that can help EPs gain insight into their practice. Our aim was to explore if EP-specific factors contribute to practice variation, and if AF affects quality of care metrics over time in an academic emergency department from January 2015, to December 2019.
Measures and Design: Each EP was given a report of clinical performance data compared to their peers. Quality of care was assessed using five quality metrics that were chosen a priori as: (1) # of patients seen hourly; (2) % of patients referred to internal medicine resulting in an admission of longer than 24 h; (3) # of CT heads ordered per patient seen; (4) # of abdomen/pelvis ultrasounds ordered per patient seen; and (5) proportion of unexpected return emergency department visits resulting in an admission. We analyzed practice data of EPs from January 2015, to December 2019.
Evaluation/results: Of the 39 EPs, 32 were included in the analysis, 4 declined to have their data included in the analysis, 3 were excluded because of incomplete shift/patient data during the study period. We analyzed the effect that three demographics (i.e., gender, type of EP certification, and years of experience) had on four quality of care metrics. Years of EP experience significantly correlated with one quality metric: EPs with more years of experience ordered fewer CT heads per patient seen.
We also analyzed the inter-EP variability and found that there was no statistically significant variation between the EPs in any of the four-quality metrics during the study period. There were no statistically significant trends in any of the quality metrics observed: the AF intervention did not result in a change in any of the care metrics over time.
Discussion/impact: AF is often used in emergency medicine to spur reflection and improve individual and group quality of care. Our study shows that AF, when data is disseminated passively, did not statistically change quality metrics over time. Contrary to previous studies, our study showed that only years of experience correlated significantly with a decreased number of CT heads ordered, and that there is no significant inter-EP variation observed in any of the four emergency department quality metrics amongst 32 full-time EPs.
Keywords: quality improvement and patient safety, audit and feedback, practice patterns

MP24

Implementing a standardized approach to the treatment of critical hyperkalemia in the emergency department: a QI initiative

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Background and Aim Statement: Critical hyperkalemia is a potentially life-threatening condition commonly seen in emergency departments (ED) requiring a timely and efficient treatment. A local audit was conducted in our ED evaluating its management by emergency physicians (EP), highlighting patient safety issues as more than 15% of cases were missed by EP thus contributing to important delays in management. We aim to have 90% of patients presenting to the ED with critical hyperkalemia receive appropriate treatment prescribed by the EP less than 1 hour after the laboratory value is obtained.

Measures and Design: Outcome measures were time-to-prescription of any hyperkalemia treatment and missed hyperkalemia. Our process measures were specific use of hyperkalemia treatments and medications (intravenous calcium and insulin), use of a standardized protocol, and lab control prior to treatment. The balancing measure used pseudohyperkalemia (hemolysis), hypokalemia and hypoglycemia. Root-cause analysis identified lab control prior to treatment as one of the main causes of delay: mean time-to-prescription is 170 minutes when a control laboratory value is done prior to treatment, and 47 minutes without. Lack of standardized approach was also highlighted. Using the Model for Improvement method, we planned three cycles:

Cycle #1 education (June 2021, Dec 2021)

Cycle #2 Elaboration of a standardized hyperkalemia protocol (Jan 2022)

Cycle #3 Dissemination of through EMR system (June 2022)

Data was analyzed using QIMacros.

Evaluation/results: We analyzed consecutive patients presenting with critical hyperkalemia from Feb 2021 to Aug 2021 and from February 2022 to November 2022 (pauses due to COVID-19 pandemic). Average time-to-prescription before our PDSA was 78 minutes, it increased to 110 minutes during Cycle 1 & 2 and decreased to 58 minutes during Cycle 3. Using an individual statististical process chart (i-chart) for time-to-prescription delays, there was a special cause variation sustained after implementation and dissemination of the standardized protocol. Missed hyperkalemia were analyzed using days between events on t-charts. There was an increase in days between events after PDSA cycles.

Discussion/impact: Our QI initiative, through implementation of a standardized protocol for treatment of hyperkalemia, significantly reduced the delay of initiation of treatment. It also increased physicians' awareness and reduced missed cases. We hope to share this protocol with EDs across our province to improve management of this critical process.

Keywords: quality improvement and patient safety, hyperkalemia

MP25

Quality improvement initiatives to improve utilization of buprenorphine to treat opioid use disorder in the emergency department

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Background and Aim Statement: Over 10,000 annual emergency department (ED) visits occur for opioid-related concerns in Ontario. Quality care is crucial; the risk for death is highest in the 30 days after an ED visit. Buprenorphine (BUP), a medication for opioid use disorder, prevents opioid-related morbidity and mortality when started in the ED; however, if a patient has recently taken opioids, a full dose can precipitate opioid withdrawal. Prior to this project, monthly, 11% of patients in the ED at St. Michael's Hospital with opioid-related diagnosis were given BUP. We aimed to increase the percentage of ED patients with opioid-related diagnosis started on BUP in the ED (ED-BUP) to 20% per month by September 2022.

Measures and Design: This is an interrupted time series analysis from September, 2020–2022. We used the Model for Improvement: root cause analysis, driver diagram, and continuous Plan-Do-Study-Act cycles, with measures analyzed using statistical process control and run charts. The primary outcome measure was the monthly percentage of patients with an opioid-related diagnosis given ED-BUP. The secondary outcome measure was the monthly rate of ED-BUP orders per all ED patients. The high-level process measure was all ED-BUP orders. The balancing measures were: length of stay for patients with opioid-related concerns when prescribed ED-BUP; and percentage of this population attending outpatient addiction follow-up within 30 days when prescribed ED-BUP. This was to ensure ED-BUP did not dissuade appropriate follow up care.

Evaluation/results: We implemented ten initiatives with iterative changes to address the findings from our root cause analysis: provider knowledge, unique pharmacology of BUP, and patient readiness. Our main intervention was implementation of a novel BUP micro-dose protocol to address all root causes. This included an order set, pre-populated prescriptions, patient handouts, and ED-wide education. Overall, we have not yet reached our aim. ED-BUP use remained stable reaching 11% of eligible patients. BUP micro-doses were provided 11 times (0-3.7% of eligible patients per month). Nursing and peer support initiatives are ongoing.

Discussion/impact: Our micro-dosing protocol provides an option for patients ineligible for full dose BUP due to their risk of precipitated withdrawal. The unmeasurable improvements in advocacy, opioid awareness, and patient autonomy bolster the impact of even a small number of patients receiving BUP. The protocols are now embedded in our standard processes and are available to other ED's.

Keywords: quality improvement and patient safety, opioid use disorder, buprenorphine

MP26

Quality improvement in emergency department discharge via QR codes

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Background and Aim Statement: The Vancouver General Hospital Emergency Department (ED) is an adult ED that sees 89,000 patients annually, 79% of whom are discharged. Effective discharge instructions support patient safety, increase patient satisfaction, and reduce preventable ED readmissions. However, a recent internal survey demonstrated that 83% of ED staff either sometimes or rarely provide discharge resources to patients.

Aim Statement: Within two months, we aimed to improve the provision of discharge resources to less than 50% of staff reporting "sometimes", "rarely", or "never" by utilizing QR codes to reduce barriers for staff.

Measures and Design: We conducted a needs assessment where an internal survey (n = 33) identified time and difficulty finding resources as the top barriers to providing discharge resources. After a literature review, our intervention focused on utilizing QR code posters linked to discharge resources created by the BC Emergency Medicine Network. Three common presentations: back pain, abdominal pain, and lacerations, were selected for the first PDSA cycle. Individual QR codes linked to the relevant discharge instructions were placed in treatment rooms, patient waiting areas, and ED hallways. Staff could guide patients to access, or text/email discharge instructions from a deidentified contact.

Evaluation/results: Data were collected via pre- and post-intervention provider surveys and chart audits. Post-survey data showed 58% of staff reported "sometimes", "rarely", or "never" providing discharge resources. Post-chart audits (n = 135) suggested a 12% increase among nurses and a 5% increase among physicians in providing discharge resources compared to pre-chart audits (n = 130). Post-survey data (n = 47) revealed a 20% decrease in staff selecting *never* on how often they provide digital resources for patients compared to the pre-survey (n = 33). Thematic analysis of qualitative responses suggested most providers found QR codes efficient, while some voiced their concerns for utilizing this method with low digital literacy patients.

Discussion/impact: We were unable to achieve our aim in our first PDSA cycle, however our results suggest QR codes as a valuable option for patients and staff wishing to access information digitally, aligning with our transition to electronic medical records. We are currently working with patient partner reviewers to discuss improvements for the next rounds of the PDSA cycle, ensuring patients' voices are heard in the improvement process.
Keywords: quality improvement and patient safety, emergency department discharge instructions, QR codes

MP27

Improving health outcomes for discharged patients awaiting EMS transport home

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Background and Aim Statement: In the emergency department (ED) at Health Sciences North in Sudbury Ontario, 70,000 patients were seen last year. In our department patients often arrive via Emergency Medical Services (EMS) transport and require these services for transport again upon discharge. EMS prioritizes bringing critical patients to hospital, resulting in significant wait times for return transport home. During this wait time, patients may miss home medication doses, go without food or beverages, and struggle to access toileting, collectively increasing the likelihood for adverse outcomes.
This project aims to improve care for patients awaiting EMS transport home after discharge from the ED. The objective is to increase the rates at which this patient group are provided with home medications, food, water, and appropriate access to toileting.
Measures and Design: A retrospective chart review was performed to identify documentation of home medications being administered, food or drink being offered or provided, and if assistance with toileting was offered or provided. All patients included in the project awaited EMS transport home for over 2 hours. 15 patients were selected prior to intervention as control. Education was provided to staff through a presentation and collaborative morning huddle discussions. An additional 15 patient's charts were reviewed within 1-month post-intervention and an additional 15 charts were reviewed 3-months post-intervention to monitor sustained change.
Evaluation/results: Within 1 month of the educational intervention, the frequency that home medications were administered increased 26.67% from the control (8/15 patients), the frequency that food or drink was offered or provided increased 20.00% from the control (4/15 patients), and the frequency that assistance with toileting was offered or provided increased 33.33% from the control (11/15 patients). 3-months post-intervention, the frequency that home medications were administered decreased 6.67% from the control (3/15 patients), the frequency that food or drink was offered or provided maintained a 13.33% increase from the control (3/15 patients), and the frequency that assistance with toileting was offered or provided maintained a 26.67% increase from the control (10/15 patients).
Discussion/impact: Collaborating with staff and providing educational material can help better address the needs of patients awaiting EMS transport home, shown through an increase in frequency of home medications being given, food, and water provided, and toileting assistance.
Keywords: quality improvement and patient safety, discharged patients, health outcomes

MP28

The virtual emergency department: a quality improvement initiative to improve access to emergency care

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Background and Aim Statement: During the COVID19 pandemic, the University Health Network (UHN) designed and implemented one of Ontario's first Virtual Emergency Department (ED) to provide patients with improved access to emergency care, while minimizing the impact on ED resources. The goal of our initiative was to conceptualize, develop and implement a novel virtual emergency department with the aim of seeing 2000 patients by Dec 2022.
Measures and Design: We used an innovation framework to conceptualize and launch the Virtual ED and the Institute of Healthcare Improvement's (IHI) model for improvement was to iteratively improve the initiative using rapid cycle PDSAs. Our PDSA's included: (1) Creation of a virtual kiosk in the ED, (2) Remote assessments for patients, (3) Nurse Practitioner (NP) lead virtual triage, (4) NP lead complete assessments, (5) Collaboration with regional hospitals to create a common front door for patients, (6) Expanded virtual assessments to include out-patient laboratory and imaging tests.
Our outcome measures included Virtual ED utilization, ED redirection, and patient satisfaction. Process measures included provider initial assessment time and visit modality (phone/video). Balancing measures included return visits to the ED within 72 h and mortality within 72 h. Descriptive measures about the cohort were also included.
Evaluation/results: Our Virtual ED initiative provided 2300 patients with care in the first 2 years after launch with a mean utilization of 70% (7 pt/day). Mean time to first provider assessment was 52 min. 74% of patients had a primary care physician (FP). The majority (61%) of patients were managed completely virtually. The most common discharge diagnosis for patients managed virtually was a body pain, followed by urinary tract infection and headache. 95% of patients who responded to surveys were satisfied with the virtual ED encounter. 69% of indicated that they would have visited the ED in person without the virtual ED. For patients discharged from the Virtual ED, return visits within 72 h to the ED were low at 5%. Mortality within 72 h was 0.
Discussion/impact: The Virtual ED is a feasible and safe alternative to in-person ED care for select low risk patients. NP based triage allowed us ensure appropriate screening and timely redirection of patients. A QI approach to implementation allowed us to iteratively adapt the model to improve utilization and maintain high patient and provider satisfaction. Future iterations will explore data-driven automated triage and NP led virtual assessments.
Keywords: quality improvement and patient safety, innovation, virtual care

MP29

The development and validation of a productivity index for emergency physicians

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Background and Aim Statement: The sustainability of Canadian healthcare has become a growing concern, particularly in our emergency departments (ED), where visits are predicted to rise 40% by 2043. ED physicians play a large role in healthcare sustainability and have expressed interest in receiving performance feedback. Multiple practice indicators have been proposed to measure various aspects of performance. However, there is currently no consensus or validation measuring ED physician productivity.
This project aims to develop and validate a consensus-based productivity measure for ED physicians.
Measures and Design: Indicators of ED physician productivity were separated into metrics (direct productivity measures) and modifiers (external factors impacting productivity which physicians have no control over). To develop the index, a delphi approach will be employed through group feedback interviews with 110 Canadian ED physicians. Participants will rate the impact of 20+ metrics and 20+ modifiers, using a Likert scale from 0 to 10, over three rounds of group consultation and re-ranking. The resultant data will then be used to create a consensus-based multivariate measure.
Evaluation/results: A literature review was conducted to generate a list of potential indicators of the productivity index. Two mock sessions, with three participants each, were conducted. Preliminary findings showed that the three most relevant metrics were (1) average charting time, (2) length of ED stay, and (3) patients seen per hour. The three most relevant modifiers were (1) human resource shortages, (2) average patient age, and (3) nurse order completion delays. Remaining interviews will be conducted, followed by validation analysis of the proposed index.
Discussion/impact: ED physician productivity is often understood as an oversimplified measure. This multivariate index accurately reflects the complexity of ED productivity as a feedback measure, while adjusting for modifiers, which account for external factors, such as resource constraints. The index was developed for national use in adult EDs, evidenced by the adoption of consensus-based methods in its development. Following validation analyses, the utility of this index in an AF approach can be investigated for its ability to facilitate improvement in physician practices in Canadian EDs.
Keywords: productivity, audit, feedback

MP30

Incorporating ATLS trauma care principles in undergraduate medical education: emergency medicine clerkship as an exemplar

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Innovation Concept: While ATLS is the standard of trauma education, there exists disparity in access; its adoption in undergraduate medical education remains lagging. The Emergency Medicine clerkship rotation underwent revision to address disparities in educational access by incorporating ATLS trauma care principles as a mandatory component of its core curricula. This curricular innovation aims to provide solutions using technology-enhanced learning to the University of Ottawa's clerkship curriculum. Data from ongoing program evaluation will be presented.
Methods: This curricular innovation started with needs assessment to direct educational strategies through course evaluation data, the Association of Faculties of Medicine of Canada's Graduation Questionnaires, and interviews. Targeted needs assessment mapped out expected clerkship proficiencies and students' preferred learning strategies. The resulting curriculum incorporates enabling readings and asynchronous web modules to scaffold interactive workshops and simulations. Hybrid learning is used for skills sessions that make use of high-fidelity simulations in order to limit the sense of isolation associated with over-reliance of technology via face-to-face learning. Program evaluation includes standardized instructor evaluations and formative interviews with all stakeholders.
Curriculum, Tool or Material: In addition to the above technology-enhanced learning strategies outlined, case method group activity included in the revised trauma curriculum involves faculty members providing polytrauma case studies to which a small group of students respond. These cases consolidate the clinical decision rules used in trauma care. Complexities in incorporating technologies are navigated by leveraging pre-existing continuing professional development sessions. The local simulation centre provides technologist, equipment, and enabling facility. Student- and instructor-facing materials are delivered electronically through SharePoint.
Conclusion: The Emergency Medicine rotation underwent curriculum renewal to incorporate ATLS trauma care principles in its curriculum. The revised curriculum is well-rated by the students, being the highest ranked clerkship rotation by the students in their Graduation Questionnaire. The material, including simulation equipment and supporting videos are reviewed periodically and continuously to reflect latest guidelines and student feedback. Students highlighted the curriculum's multimodal scaffolding and the high yield, hands-on teaching that they receive.
Keywords: innovations in EM education, clerkship, trauma

MP31

HEARTS ECG workshop: a novel approach to resident and student ECG education

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Innovation Concept: ECG interpretation is a life-saving skill in emergency medicine (EM), and a core competency in undergraduate medical curricula. However, confidence and competence for residents and students is low (42% and 56%, respectively). We developed a novel educational intervention that teaches a systematic ECG approach to EM residents and medical students simultaneously.
Methods: We used the Kern Six-Step Approach to Curriculum Development: (1) problem identification – a literature review of ECG education, and (2) targeted needs assessment – survey of medical students and EM residents at our institution. These informed the program's (3) goals and objectives, which included selecting 20 ECGs based on a consensus of Canadian EM residency program directors. (4) Educational strategy included flipped classroom learning, EM residents learning through teaching medical students the locally developed systematic HEARTS approach to ECG interpretation (Heart rate/rhythm, Electrical conduction, Axis, R-wave progression, Tall/small voltages, and ST/T changes). (5) Implementation included pre-workshop reading material for all participants and detailed explanations of the HEARTS approach included in the teaching materials to residents, and then a 5-h workshop with supervised small group teaching. (6) Evaluation and feedback included resident/student surveys, using likert scales and qualitative questions for Kirkpatrick program evaluation.
Curriculum, Tool or Material: The workshop was piloted with six junior EM residents and 58 medical students. After evaluation and feedback it was repeated and expanded to nine junior EM residents and 68 medical students from four medical schools. Kirkpatrick evaluation of reaction and learning found residents and medical students agreed or strongly agreed that the workshop improved their ability (100% and 95%, respectively) and confidence (77% and 88%, respectively) in interpreting ECGs. Suggested changes included the creation of longitudinal sessions with graded difficulty. Residents

reported behavior change (92.3%) with ongoing use of the HEARTS approach clinically and through teaching.
Conclusion: The HEARTS ECG workshop is an innovative teaching method for EM residents and medical students, and can be easily replicated and adapted for all levels of training. Future directions include integration within medical school and EM residency curricula, and workshops for EM physicians to update their ECG interpretation knowledge and skills.
Keywords: innovations in EM education, ECG, medical education

MP32

Education innovation: leveraging technology to enhance the postgraduate educational experience at the site level

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Innovation Concept: Clinician educators from emergency departments (EDs) across Canada often operate in silos. Limited information is shared about approaches to learner scheduling, teaching methods, and program administration. Those in educational leadership roles often rely on institutional momentum and receive little formal training in this area. In 2021, several novel strategies were launched at the ED in Mount Sinai Hospital (MSH) in Toronto to improve the postgraduate learner experience.
Methods: New technological platforms were introduced to improve communication, organization of rotation materials and increase feedback from residents and faculty. Feedback was used to enact multiple stepwise changes via plan-do-study-act (PDSA) cycles at the site level.
Five innovations were introduced: (1) electronic daily shift evaluations; (2) routine review of congregate feedback; (3) structured orientation sessions with handbooks, slides, charting and oral presentation exercises; (4) hybrid self-scheduling model and the integration of a main preceptor; and (5) dedicated educational website for MSH ED (www.mshemerg.com). Surveys, websites and docu ments were created using template based platforms such as Qualtrics, Google, and Wix.
Curriculum, Tool or Material: These initiatives created a more tailored educational experience for residents by incorporating preferences, learning goals and accommodations with scheduling. It provided more timely feedback with increased legibility from faculty and residents. It readily identified learners with difficulties and professionalism issues. It streamlined the orientation process and created more consistency. The website centralized content about in-house policies and additional educational resources.
In the post-innovation phase in 2021 and 2022, qualitative end-of-rotation feedback at MSH showed residents particularly identified the technological changes as significant strengths. In comparison, scheduling and communication were sometimes identified as weaknesses in years prior. Nonetheless, sites exploring new education initiatives should reflect on prior feedback to direct change and recognize there is no "one-size-fits-all" approach. There may be limitations depending on how technologically savvy faculty and administrative support staff are, and can be a barrier to sustainability.
Conclusion: Lessons learned from the education innovations at MSH ED can help other clinician educators gain insight about the logistics with change management.
Keywords: innovations in emergency medicine education, technology, postgraduate

MP33

A department and hospital-level quality improvement project to improve preparedness for major heat events based on the lived experience of frontline workers during the 2021 heat dome

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Background and Aim Statement: The report for the Chief Coroner of British Columbia identified 619 heat related deaths between June 25th and July 1st, 2021. Significant patient surges during this time challenged local emergency departments with equipment and space shortages. As the number of heat events and extreme temperatures are expected to worsen with global warming, we set out to identify pragmatic bottom-up hospital-level changes to improve our preparedness for future heat events at two tertiary care hospitals.
Aim: To improve hospital preparedness for major heat events, as measured by front-line worker confidence, by implementing the most feasible recommendations from nurses and physicians directly involved in the care of heat wave affected patients.
Measures and Design: Data was collected with surveys. As the topic of interest was major heat events, plan-do-study-act (PDSA) cycles were annual. Our primary measures were (1) reported feeling of preparedness on a scale of 1–10, (2) feedback on what individuals found helpful and what could be improved, and (3) awareness of and sense of helpfulness for interventions.
Evaluation/results: In consultation with hospital administration, department managers, and the needs identified in our pre-survey, the following were implemented for the summer of 2022: (1) a system to bring ice down to the ED from other departments, (2) a heat stroke management flow sheet, (3) an inventory update of cooling equipment, (4) a heat stroke blood work panel, (5) an in-situ simulation, and (6) hospital level surge planning. Among those who were aware of these changes, the three most frequently identified as helpful were the heat stroke management sheet, the inventory update, and the ice porter system. None of the changes were identified as unhelpful. The largest feedback for the summer of 2022 was for improved communication regarding new changes, resources, and equipment. The overall feeling of preparedness on a scale of 1–10 between the summer of 2021 and the summer of 2022 increased from 3.5 (2.9 to 4.1 with a 95% CI) to 5.7 (4.9 to 6.5 with a 95% CI), respectively [$p = 0.00004$].
Discussion/impact: The changes introduced for the summer of 2022 were perceived as being helpful for our preparedness for major heat events by frontline workers. The changes we implemented and summarized here were low cost, immediately relevant, and easily scalable to other hospitals undoubtedly facing heat events in the coming summers.
Keywords: quality improvement and patient safety, heat-related illness, environmental medicine

MP34

Serious outcomes in presyncope patients presenting to the emergency department: a systematic review

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Introduction: Syncope is transient loss of consciousness due to brain hypoperfusion. In presyncope, patients experience same symptoms without losing consciousness. While extensive syncope studies showed its risk of serious outcome, the outcome in presyncope is not studied much. This study systematically reviewed the studies on presyncope in terms of outcomes.
Methods: Observational studies in the emergency department (ED) with all-cause presyncope with outcome were include. Studies with a cause of presyncope (e.g. hypoglycemia, seizure, stroke, intoxication, and trauma) were excluded. We restricted our study to only English publications. We searched the MEDLINE, Embase, EBM Reviews, Scopus, and web of science from inception date to October 2022.
Results: 1766 articles were screened by two reviewers and 28 articles were selected for a full-text assessment. Six (5 prospective and 1 retrospective) articles with 3953 presyncope patients were included in the systematic. All the studies were from North America but one, which was from Europe. Although some included studies were found to have some weaknesses associated with bias, they had acceptable quality. The prevalence of overall adverse outcome were 4.54–24.10% for all adults, and 5.53% and 18.7% among elderlies. Arrhythmia is the most prevalent adverse outcome with 17.39–2.16% and it is followed by anemia/hemorrhage. While other outcomes were not different among adults, MI was in the third place according to the only one study in the elderly. One study assessed inter-rater agreement for presyncope diagnosis between emergency physicians in 62 of their patients. It showed a K of 0.88. While one study showed that physicians risk assessment was lower in presyncope group in comparison to the syncope group, in another study where patients assigned to the vasovagal, orthostatic hypotension, cardiac, and unknown groups at the end of the ED visit, all groups had 1–2% of the outcomes in each group.
Conclusion: The adverse event can happen in 5–25% in presyncope patients. Among them, arrhythmia is the most prevalent in all ages.
Keywords: presyncope, serious outcome, prevalence

MP35

Point of care ultrasonography use in the emergency department for adult patients with acute dyspnea

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Introduction: The Coronavirus pandemic has brought attention to the dangerously long wait times in Canadian Emergency Departments (EDs). Will adopting bedside imaging techniques address this ED crisis? In comparison to traditional ultrasound devices, point of care ultrasonography (PoCUS) has been suggested to be cost-effective, enhance diagnostic accuracy, and decrease time to diagnosis. However, the evidence on this topic is insufficient to inform practice. Our study examines the influences of PoCUS use on length of time to final disposition and ED stay for patients presenting to the ED with acute dyspnea. We hypothesize that PoCUS use will improve both metrics.
Methods: This was a retrospective chart review examining the charts of 500 patients who presented to Brampton Civic Hospital ED with acute dyspnea from December 2021 to April 2022 and were admitted to the hospital. Adult patients (ages 18+) were included while patients with a Canadian Triage and Acuity Scale (CTAS) score of 4 and 5, suggesting low acuity, were excluded. Patients who had PoCUS performed during their ED stay were compared with patients who had not undergone PoCUS to compare the length of time to final disposition (physician initial assessment time to ED disposition) and length of stay in ED (time from triage to leaving ED). Data was obtained from the hospital dataset and metrics were analyzed using independent t-tests.
Results: Due to illegibility or lack of ED report, 38 charts were omitted. Of the remaining 462 participants, 20% had PoCUS performed during their ED stay. The 95 participants who received PoCUS ($M = 4.71$ h, $SD = 2.46$) demonstrated a statistically significant decrease in time needed to make the final disposition decision, $t(459) = 2.25$, $p = 0.025$ compared to the 367 participants in the non PoCUS group ($M = 5.61$ h, $SD = 3.68$). There was no significant decrease in ED length of stay, $t(460) = 0.87$, $p = 0.387$, despite the PoCUS group ($M = 33.10$ hours, $SD = 18.55$) spending 1.81 h less in the ED compared to the non PoCUS group ($M = 34.91$ h, $SD = 18.11$).
Conclusion: This study adds to the literature on PoCUS outcomes by demonstrating a significant decrease in the time to disposition decision with PoCUS usage and a clinically significant mean reduction in ED length of stay (1.81 h decrease). Although these findings suggest that PoCUS may expedite ED processes, given the sample size limitations, future research should confirm the results with a larger sample size.
Keywords: point of care ultrasonography, emergency medicine, dyspnea

MP36

Derivation of a clinical decision rule to guide head CT use in older adults who have fallen

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Introduction: Ground level falls are common among older adults and are the most frequent cause of traumatic intracranial bleeding. We lack comprehensive recommendations to guide head computed tomography (CT) use in this population. The objective of our study was to derive a clinical decision rule to identify older adults who present to the emergency department (ED) after a fall who do not have clinically important intracranial bleeding and do not require a head CT scan.
Methods: This prospective cohort study was conducted in 11 EDs in Canada and the United States between January, 2019 and November, 2020. We enrolled patients $\geq$ age 65 who presented to the ED after falling from standing, from a chair, toilet seat or bed within the prior 48 h. Data were collected on 17 potential clinical and historical predictor variables. The primary outcome was the diagnosis of clinically important intracranial bleeding within 42 days of the index ED visit. An independent adjudication committee determined the primary outcome, blinded to all baseline data. The rule was developed using 1000 bootstrap samples from all the data, randomly selecting patients with replacement. Logistic regression models were developed and reduced using fast backward elimination for each bootstrap sample. Predictor variables were ranked according to the proportion of models in which they appeared. The final decision rule variables were selected if they appeared in at least 10% of the bootstrap models.
Results: There were 4308 participants, median age was 83, 2770 (64%) were female, 2040 (47%) fell inside their house, 1119 (26%) were anticoagulated, 1,567 (36%) took antiplatelet medication. In total, 139 (3.2%) participants were diagnosed with clinically important intracranial bleeding within 42 days of their ED visit. We developed a Falls decision rule indicating that no head CT is required if there is (1) no history of head injury on falling, (2) no amnesia of the fall, (3) the Glasgow Comma Scale is normal for the patient, (4)

no new abnormality on neurological examination, and (5) the Clinical Frailty Scale is < 5 (patient is not dependent on others). Rule sensitivity was 98.6% (95% CI 94.9, 99.6%) and specificity 20.3% (95% CI 19.1, 21.5%). Rule application would avoid CT scanning in 20% of the study population.
Conclusion: We prospectively developed the Falls decision rule which excludes clinically important intracranial bleeding in older adults who fall and could standardize the use of head CT.
Keywords: falls, geriatrics, CT head

MP37

Certified child life specialist in a pediatric emergency department: impact of a quality improvement initiative to improve procedural pain and distress management for needle procedures

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Introduction: Needle procedures are a cause of pain and distress for children in the emergency department (ED). Combined strategies such as preparation, comfort positions, distraction/relaxation techniques and topical anesthetic can help children cope with various painful and stressful procedures. A trained professional such as a Certified Child Life Specialist (CCLS) can facilitate the uptake of these strategies. The objective of this study was to evaluate the use of strategies to reduce procedural pain and distress for children in the pediatric ED of a tertiary care pediatric hospital with the implementation of an institutional quality improvement (QI) initiative that worked closely with a CCLS.
Methods: An ongoing hospital-wide QI initiative, called *Tout doux*, aims to alleviate procedural pain and distress. To evaluate the impact of the QI initiative on the use of pain and distress strategies for patients with a needle procedure, we prospectively recorded CCLS interventions in the pediatric ED over a one-year period. More specifically, the number of strategies used for each patient undergoing a needle procedure was reported to track progress throughout the integration of the *Tout doux* QI project.
Results: Between Sept 2021 and Aug 2022, the CCLS was present for 397 needle procedures (Mean age: 6 yo [0 months-17yo]), including IV-line insertions (56%), venous blood draws (30%) and capillary blood tests (14%). Parents were present in 99% procedures. Preparation strategies by the CCLS were possible for 65% of the procedures. Distraction was used for 98% of the procedures, using either active (eg. interactive games [56%]) or passive distraction (eg. video [31%], music [20%]). Deep breathing was used in 46% of procedures. A topical anesthetic was proposed to 70% of children. The proportion of children receiving at least 3 strategies alleviating procedural pain and distress increased to more than 90% during the last 7 months (except for 1 exceptionally busy month) in comparison to 22%-66% for the first 5 months, with the implementation of the *Tout doux* initiative.
Conclusion: A QI project aiming to improve the management of procedural pain and distress in an institution increased the use of combined coping strategies for children in the pediatric ED. This QI initiative sensibilized the health care providers to the importance of the combined use of strategies, promoted by the presence of the CCLS. Further studies will need to evaluate their impact on patients and the sustainability of their use.
Keywords: procedural pain management, pediatric, quality improvement

MP38

Simulation education in the age of CBME: a qualitative study of the use of simulation based education in Canadian emergency medicine programs

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Introduction: All Royal College emergency medicine (EM) residency programs in Canada incorporate simulation-based education (SBE). This study examines how SBE in Canadian Royal College EM programs has evolved in response to the implementation of competency-based medical education (CBME).
Methods: Semi-structured interviews of Royal College EM program simulation directors, or their delegates, were conducted. Open ended questions were generated by the investigators with content informed by a literature review of current SBE practices. Questions examined the impact of CBME and current use of SBE activities in the domains of: program and curriculum structure, procedural task training, case scenario generation, assessment, and barriers to SBE.
Results: Thirteen (76%) programs participated in the study between May 2022 and December 2022. All programs reported currently using SBE within their curriculum. A majority of programs have modified their simulation curriculum since the implementation of CBME. Programs reported that the EM Entrustable Professional Activities (EPAs) and required training experiences were used to inform curricular revisions. The greatest impact of CBME has been the new role of frequent, low-stakes assessment in the simulation environment, typically in the form of resident-initiated EPAs. However, there were concerns that judgments of performance by way of assessments must be balanced with the preservation of psychological safety of the simulation environment. Participants reported that procedural simulation and barriers in SBE were minimally impacted by CBME implementation. A majority (92%) of programs would cautiously welcome a standardized national simulation curriculum. Participants emphasized that program structure and size would need to be considered to ensure that current resources were not exceeded in order for this to be successful.
Conclusion: The majority of EM programs have modified their simulation programs in response to the implementation of CBME. The largest impact has been in the use of assessment in the simulation environment, though concerns remain about the role of assessment and preserving the psychological safety of simulation.
Keywords: simulation, competency based medical education

MP39

Telesimulation in medical education: a scoping review

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Introduction: Simulation has been used across all specialities as a mode of education delivery, assessment, and evaluation. Telesimulation incorporates simulation and telecommunication to connect preceptors and learners in different geographical locations. Telesimulation has allowed continued medical education during the COVID-19 pandemic, as there has been a shift in the way medical education is delivered to include virtual and remote-access mediums. Applications and usefulness of telesimulation in medical education has not been well-defined in the literature. This scoping reivew aims to discover the utility and effectiveness of telesimulation in medical education.
Methods: An initial search of PUBMED, Scopus, and EMBASE in September 2021 for English language publications yielded 4653 articles. 1610 duplicates were removed and 3043 articles were

screened by title and abstract. After screening, 438 full-text reviews were completed, and 42 articles were eligible for inclusion.
Results: 26 studies examined knowledge improvement outcomes when using telesimulation. Telesimulation appears to be generally effective at improving knowledge outcomes, and offers a comparable increase in knowledge compared to other simulation methods. 31 studies assessed learner satisfaction outcomes, and some positive themes from learners include: telesimulation is realistic, telesimulation is a reasonable substitute to in-person simulation, and learners had a high overall satisfaction with telesimulation. Negative themes that emerged were: technical issues with the telesimulation platform, learners preferred in-person simulation over telesimulation, and there was poor ability to hear others and communicate on the platform. Four studies examined faculty perceptions of telesimulation, and all faculty from the four studies generally found telesimulation to be a reasonable and useful alternative to in-person simulation.
Conclusion: Telesimulation has been used for many medical education applications across the globe. In a time of physical distancing and virtual education, telesimulation offers a unique way of continuing simulation education without learners and preceptors needing to be in the same geographical location. There were various positive and negative themes that emerged in this scoping review, but generally telesimulation seems to be a reasonable alternative to in-person simulation. Telesimulation, moving forward, will hopefully further expand its applications and utility in medical education.
Keywords: telesimulation, simulation, medical education

MP40

'Your comment is not as helpful as it could be…do you still want to submit?' Using natural language processing to identify the quality of supervisor narrative comments in competency based medical education

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Introduction: Trainee development relies heavily on narrative comments from front line supervisor assessments, yet these comments are not routinely measured for quality to provide feedback to supervisors. The Quality of Assessment for Learning (QuAL) score has validity evidence for measuring quality in this context but it is time intensive to score the large volume of these comments generated in medical education assessment programs. Natural language processing (NLP) models have the ability to rapidly analyze and categorize human text. We set out to develop an NLP model for applying the QuAL score to supervisor narrative comments.
Methods: 1250 EPA assessments were randomly extracted and de-identified from both McMaster and Saskatchewan's Emergency Medicine (EM) residency training programs. These comments were put into 25 unique 100 comment surveys for rating. 25 EM faculty members and 25 EM residents each filled out a survey rating comments with the QuAL score. Discrepant QuAL scores were resolved by two of the study authors. 80% of the data were used as the training data set and 20% for the validation set. A transformer model technique was used to determine overall QuAL score as well as QuAL score sub-components.
Results: All 50 raters completed the rating exercise. Comments with imperfect agreement on QuAL score were resolved by two study authors. The QuAL score sub-components had a balanced accuracy of 0.615 (description of performance), 0.85 (suggestion for improvement) and 0.902 (linking performance and suggestion). For the overall QuAL score, the NLP model had a balanced accuracy and top-2 accuracy of 0.52 and 0.83 respectively. The NLP model can be viewed at www.commentquality.ca.
Conclusion: We have developed an NLP model for rating the quality of narrative supervisor comments in Competency Based Medical Education (CBME) using the QuAL score. This model has the potential to be integrated into learning management systems and automatically score the large volume of comments in a program or institution. This can serve as a tool for nudging in real time, audit and feedback in faculty development initiatives and an outcome measure for overall program evaluation in CBME.
Keywords: feedback, narrative comment, competency based medical education

MP41

A survey assessing the impact of a novel vertical mentorship program on the personal and professional perspectives of medical students, residents, and staff physicians working in emergency medicine across Canada

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Introduction: Novel mentorship formats deviating from the traditional staff-student dyad are beginning to emerge, and the CAEP Women in Emergency Medicine (WEM) Committee has implemented a novel, vertical mentorship program in the hopes of increasing access to mentorship across Canada for students, residents, and attending physicians. The purpose of this study is to conduct a needs assessment for a mentorship program as such via an early mentorship survey; to assess the impact on participant personal and professional development, and to collect feedback on the mentorship format via a post mentorship survey.
Methods: The vertical mentorship consisted of an attending physician, resident, and medical student all practicing or interested in emergency medicine. Groups were created based on preference of location or special interest. The mentorship was implemented in December 2021, and functional roles and meeting frequency were left to the discretion of each group. The early mentorship survey was sent out in April 2022 and the post-mentorship survey was sent in December 2022.
Results: For the early-mentorship survey, the respondents comprised of 42% staff physicians and 58% trainees (residents and students). The post-mentorship respondents were 33% staff and 66% trainees. Feedback was largely very positive in support of the vertical group format and a majority of respondents would participate again. Participants expressed that they felt the program would be most beneficial for emotional wellbeing, career development, and networking; these needs had all been adequately met as evidenced in the post-survey responses. While most respondents stated they felt forming connections on a national level was important to gain and learn from new perspectives, several respondents mentioned time-zone related scheduling difficulties or would have preferred in person meetings rather than virtual. Some groups also had hoped for a more structured approach with clearer expectations to mentorship roles and meeting frequency. All results were consistent across staff physician, resident, and student responses.
Conclusion: The implementation of a novel, national, vertical mentorship program by the CAEP WEM Committee was largely beneficial for the personal wellbeing and professional development of participants. In the future, the committee will structure mentorship roles, clear expectations of meeting timelines and will allow participants to select local or national group preferences.

Keywords: innovations in emergency medicine education, mentorship, professional development

MP42

Characterizing the association between asthma and COVID-19 severity

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Introduction: Despite heterogeneity in outcomes in patients infected with SARS-CoV-2, few studies have investigated the risks of developing respiratory failure and death in COVID-19 patients with pre-existing asthma. This study evaluated the impact of COVID-19 on patients with asthma.
Methods: This was a retrospective cohort study using data from the Canadian COVID-19 Emergency Department Rapid Response Network (CCEDRRN) registry. CCEDRRN collected data from consecutive patients presenting to one of 52 participating emergency departments and being tested for SARS CoV-2. We included patients from March1st, 2020 to December 31st, 2021 who met the following criteria: patient 18 years or older who tested positive for COVID-19. We excluded patients under 18 years of age, patients who tested negative for COVID-19, patients who tested positive for COVID-19 but had no symptoms, patients transferred to a hospital outside of CCEDRRN, and patients who died outside of CCEDRRN hospitals, as we would have been unable to ascertain their outcomes. The primary outcome of interest was a composite of intubation or death in the emergency department (ED) or hospital. Multivariable modified Poisson regression was used to assess the association between asthma and the composite outcome among those with COVID-19 while adjusting for possible confounding variables, including inhaled corticosteroid (ICS) use.
Results: There were 38,139 patients who met study inclusion criteria. Among these, a total of 2826 patients with asthma (7.41%) and 35,313 patients without asthma were compared. We found no evidence to suggest that a prior diagnosis of asthma is associated with intubation or death in the hospital or the development of severe COVID-19 among patients presenting to the ED with SARS CoV-2 infection (RR = 0.97; 95% CI: 0.86–1.1), and (RR = 0.96; 95% CI: 0.81–1.13), respectively.
Conclusion: We found no evidence to suggest that asthma is associated with death or intubation in the hospital or the development of severe COVID-19 among emergency department patients infected with SARS CoV-2.
Keywords: COVID-19, SARS-CoV-2, asthma

MP43

The role of D-dimer testing in the investigation of pulmonary embolism among patients with acute exacerbations of chronic obstructive pulmonary disease (AECOPD) seen in emergency departments: choosing wisely.

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Introduction: Patients commonly present to the emergency department (ED) with symptoms of an acute exacerbation of chronic obstructive pulmonary disease (AECOPD). Despite low prevalence of pulmonary embolism (PE) in AECOPD, evidence suggests as many as one in six such patients receive some investigations for PE. We sought to examine the use and utility of D-dimer testing among patients with AECOPD seen in Canadian urban EDs.
Methods: We conducted a retrospective cohort study of all adults presenting with AECOPD to six EDs in Alberta between January 2015 and June 2021. We analyzed information on demographics, ED investigations to rule out PE (D-dimer, advanced imaging including ventilation-perfusion [V/Q] lung scans and computerized tomography [CT]), operational and clinical outcomes from provincial health administrative data. The D-dimer test results were classified as positive using the conventional (500 μg/L) and age-adjusted D-dimer (AADD) cutoffs (by age x 10 μg/L in patients 50 years or older).
Results: There were a total of 12,185 unique patients with AECOPD included over the 6-years study period. The median age of patients was 70 years and 50% were male. Among those who underwent further investigations for PE (n = 2072), 84% had D-dimer testing, 44% had CT scan, and 2% had VQ scan. Of the 1,735 patient who received D-Dimer testing, 944 (54%) were classified as negative using the AADD compared to 714 (41%) with the conventional cutoffs (13% increase). Among 944 patients who had a negative AADD result, 16% had further imaging investigations and 0.5% were diagnosed with PE. Among 791 patients who were classified as having a positive AADD, 60% had imaging and 3% received a diagnosis of PE. Additionally, 337/10,450 (3%) had advanced imaging performed without D-dimer testing; 0.1% had PE identified.
Conclusion: The overall prevalence of PE among patients with AECOPD presenting to the ED was higher in patients with a positive D-dimer. Despite significantly higher proportion of patients undergoing advanced imaging for PE, the results suggest that using an AADD cutoff and considering other patient factors might be cost-effective and safe in patients with low probability of PE, preventing unnecessary advanced imaging.
Keywords: pulmonary embolism, chronic obstructive pulmonary disease, D-dimer

MP44

First emergency department vital signs correlate to prehospital vital signs in severely injured patients.

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Introduction: Prehospital vital signs are frequently missing or incomplete from hospital-based trauma registries due to various challenges in obtaining and recording these values. This limits the potential use of prehospital vitals as key variables in many studies. Our study aims to determine whether first emergency department (ED) heart rate (HR) and systolic blood pressure (SBP) correlatate to preshospital HR and SBP. This could support the use of ED vitals as a substitute for missing prehospital vitals.
Methods: We retrospectively identified a cohort of adult (aged ≥ 17 years) trauma team activations presenting to St. Michael's Hospital—a level I trauma centre in Toronto, Ontario—directly from the scene of injury between January 2015 and December 2019. Patient demographics, prehospital and ED vital signs and interventions, and patient outcomes were abstracted from the hospital-based trauma registry. Intraclass correlation coefficients (ICC) were calculated in complete cases to compare prehospital and first ED vital signs.

Results: A total of 3528 patients met inclusion criteria. The mean age was 42.6 years, 74.8% (n = 2639) were male, and the median injury severity score was 8.0. In total, 20.3% (n = 716) of all patients had missing prehospital HR values and 21.2% (n = 749) had missing prehospital SBP values, 94.7% (n = 709) of whom were also missing prehospital HR values. The average difference between prehospital and first ED HR and SBP were − 5.18 and 3.73 respectively. Both heart rate (ICC 0.56, 95% CI 0.50–0.63) and systolic blood pressure (ICC 0.54, 95% CI 0.49–0.60) showed fair agreement between prehospital and first ED values.
Conclusion: Prehospital vital signs are frequently missing in registry databases for critically injured patients. ED values for HR and SBP appear to have fair correlation with prehospital vitals, and could be used as a substitute for missing prehospital vitals in many studies.
Keywords: prehospital trauma care, traumatic injuries

MP45

Epidemiology and outcomes for level 1 and 2 traumas during the first wave of COVID19 in a Canadian centre

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Introduction: With the rapid spread of COVID19 across the world, public health measures such as stay-at-home orders and physical distancing were imposed to reduce virus transmission and virus-related hospital admissions. The healthcare effects of these public health measures have been variable; in some cities, traumas, and admissions due to trauma decreased, effectively reducing strain on the healthcare system at the beginning of the pandemic. Our study sought to examine how the COVID19 pandemic impacted trauma patterns, volumes, and outcomes in a western Canadian level 1 trauma center.
Methods: A retrospective cohort study assessing level 1 and 2 trauma patients presenting to our center during the COVID19 "lockdown" period (March 15–June 14, 2020) compared to a similar cohort of patients presenting during a "control" period (March 15–June 14, 2019).
Patients were included if they were triaged as a level 1 or 2 trauma as per our local trauma criteria. Charts were reviewed electronically and variables of interest included age, gender, comorbidities, mode of arrival, mechanism of injury (blunt or penetrating), blood alcohol level, time to computed tomography (CT, defined as arrival time to CT), time to electrocardiogram (EKG, defined as arrival time to EKG), emergency department (ED) boarding time (defined as arrival time to admission to an inpatient bed), the need for intubation and mechanical ventilation, and 30-day mortality. The Charlson Comorbidity Index (CCI) and injury severity score (ISS) were calculated based on data obtained from the chart review.

T test and Wilcoxon non-parametric test to compare normally and non-normally distributed continuous variables, respectively, between groups (2019 vs. 2020). Categorical variables were compared using the Chi-square test and Fisher's exact test as appropriate.
Results: Overall there was a 7.8% reduction in trauma volumes during the lockdown period, and this was associated with a shorter average ED length of stay (6.2 ± 4.7 h vs. 9.7 ± 11.8 h, $p = 0.003$), reduced time to computed tomography (88.5 ± 68.2 min vs. 105.1 ± 65.5 min, $p < 0.001$), a reduction in intensive care unit admissions (11.0 ± 4.9% vs. 20.0 ± 15.5%, $p = 0.001$), and higher injury severity score (6.5 ± 7.6 vs. 6.2 ± 9.5, $p = 0.04$).
Conclusion: Our findings suggest that lockdown measures imposed during the first wave of the COVID19 pandemic had a significant impact on trauma patients.
Keywords: trauma, COVID-19

Poster

PO001

Machine learning for the diagnosis of acute coronary syndrome using a 12-lead ECG: a systematic review

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Introduction: Prompt diagnosis of acute coronary syndrome (ACS) using a 12-lead electrocardiogram (ECG) is critical for emergency physicians. While computerized algorithms for ECG interpretation are limited in their accuracy, Machine Learning (ML) has shown promise in several areas of clinical medicine. We performed a systematic review comparing the performance of ML-based ECG analysis to clinician or non-ML computerized ECG interpretation in the diagnosis of ACS for emergency department (ED) or prehospital patients.
Methods: We searched Medline, Embase, Cochrane Central, and CINAHL databases from inception to May 18, 2022. Our search strategy was developed by a health sciences librarian and peer-reviewed according to PRESS guidelines. Two independent reviewers performed title and abstract screening followed by full text review, with disagreements resolved by a third reviewer. We included studies that compared ML algorithms to either clinicians or non-ML based software in their ability to diagnose ACS using only a 12-lead ECG, in adult patients experiencing symptoms concerning for ACS in the ED or prehospital setting. Risk of bias was assessed using the QUADAS-2 tool. Prospero registration CRD42021264765.
Results: Our search yielded 1062 abstracts. 10 studies met inclusion criteria. Five model types were tested, including neural networks, random forest, and gradient boosting. In five studies with complete performance data, ML models were more sensitive but less specific (sensitivity range 0.59–0.98, specificity range 0.44–0.95) than clinicians (sensitivity range 0.22–0.93, specificity range 0.63–0.98) in diagnosing ACS. In four studies that reported it, ML models had better discrimination (area under ROC curve range 0.79–0.98) than clinicians (area under ROC curve 0.67–0.78). Heterogeneity in both methodology and reporting methods precluded a meta-analysis. Several studies had high risk of bias due to patient selection, lack of external validation, and unreliable reference standards for ACS diagnosis.
Conclusion: ML models have higher discrimination and sensitivity but lower specificity than clinicians in ECG interpretation for diagnosing ACS. ML-based ECG interpretation could potentially serve as a "safety net", alerting emergency providers to a missed ACS when it has not been diagnosed. Future ML research should ensure adherence to reporting guidelines including use of an external validation cohort and accepted diagnostic reference standards.
Keywords: ECG, acute coronary syndrome, machine learning

PO002

Tranexamic acid in emergency medicine. an overview of reviews

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Introduction: Tranexamic acid (TXA) is a common haemorrhage control agent in both emergency department (ED) settings and intraoperatively. While efficacy and potential harms are well-studied,

there are no overviews of reviews completed on TXA efficacy in the ED setting. We set out to provide an overview of systematic reviews on TXA efficacy in trauma, gastrointestinal bleeding, and subarachnoid haemorrhage in the ED setting, with outcomes including short and long-term mortality, TE events, and whether bleeding continued. Our review is guided by the PRIOR statement.

Methods: We searched Pubmed, Medline, and EMBASE using broad search terms for systematic reviews, and calculated pooled relative-risk ratios using random and fixed-effects modelling from these studies. A risk-of-bias assessment was also completed for each review using GRADE criteria and AMSTAR2 criteria. Corrected covered area was calculated to determine risk of bias from repeated inclusion of the same primary study across systematic reviews. Pooled relative risk ratios (RRs) were calculated for each clinical context and study outcome.

Results: We identified 13 systematic reviews for inclusion, with a variety of different outcomes. We identified improvements in 24-h mortality for trauma (RR 0.88, 95% CI 0.84–0.92) and gastrointestinal bleeds (RR 0.30, 95% CI 0.23, 0.39), and decreased long-term gastrointestinal bleed mortality (RR 0.57, 95% CI 0.48–0.69). We also identified an increase in TE risk in gastrointestinal bleeding scenarios (RR 1.45, 95% CI 1.09–1.94), but no other clinical scenarios.

Conclusion: TXA is effective in reducing mortality following trauma and gastrointestinal bleeds, however there is limited evidence at this time to support TXA administration in the context of subarachnoid haemorrhage. TE risk is elevated when used in gastrointestinal bleeds. Selective use in high-risk patients may be warranted, with consideration for TE prophylaxis after stabilization. TXA should strongly be considered in management of trauma and gastrointestinal bleeds in ED and prehospital settings.

Keywords: tranexamic acid, evidence-based medicine, quality improvement

PO003

Opioid-related emergency department visits and deaths following a harm-reduction intervention: a time-series analysis

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Introduction: To date, there has been little research on safe consumption site (SCS) and community-based naloxone (CBN) program impact on regional opioid-related emergency department (ED) visits and deaths. We sought to determine intervention impact on regional opioid-related ED visit and death rates in the province. Our main question was "What is the impact of opioid-intervention strategies on municipal ED visits and deaths?"

Methods: We used retrospective observational design, via interrupted time-series analysis and ARIMA modelling to compare municipal opioid-related ED visit volume and opioid-related deaths (defined by poisoning and opioid-use disorder). There were 24107 ED visits and 2413 deaths in the study. We compared rates pre- and post-program implementation in individual Alberta municipalities, and province-wide following SCS (March, 2018 to October, 2018) and CBN (January, 2016) program implementation.

Results: Results: Following SCS site opening, we saw decreased opioid-related ED visits in Calgary (level change − 22.7 (− 20%) visits/month; 95% CI − 29.7, − 15.8) and Lethbridge (level change − 8.8 (− 50%) visits; 95% CI − 11.7, − 5.9), and decreased deaths/month in Edmonton (level change − 5.9 (− 55%) deaths; 95% CI − 8.9, − 2.9). We observed increased ED visits following CBN program implementation in urban (level change 38.9 (46%) visits; 95% CI 33.3, 44.4) Alberta. We also observed an increase in urban opioid-related deaths (level change 9.1 (40%) deaths; 95% CI − 6.7, 11.5). Lastly, significant negative changes in slope were observed post-CBN implementation for rural ED visits, and urban ED visits and deaths.

Conclusion: Conclusion: Our results suggest differences exist between municipalities employing similar interventions. Our results also suggest contextual variation, such as illicit drug supply toxicity, may modify the ability for CBN to prevent opioid overdose without a fulsome public health response.

Keywords: opioid, safe consumption site, take-home naloxone kit

PO004

Impact of a rapid high-sensitivity troponin protocol on length of stay for adult patients presenting with chest pain to a tertiary care emergency department.

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Introduction: Chest pain is a common presenting complaint in emergency departments (ED) associated with prolonged lengths of stay (LOS). High-sensitivity troponin (hs-Tn) assays, clinical decision rules and accelerated diagnostic protocols (ADP) all show promise in safely reducing LOS; however, Canadian evidence is sparse. The objective of this study was to assess the impact of the implementation of a hs-TnI assay and its associated ADP on ED LOS and important safety outcomes for patients presenting with chest pain.

Methods: A new ADP and hs-TnI assay were introduced following a multi-faceted implementation strategy to a single center in November 2020. This retrospective cohort study used population-based linked health administrative data for adult patients presenting to a tertiary care urban Canadian ED with a primary presenting complaint of chest pain of cardiac origin and a Canadian Triage and Acuity Scale score of 2 or 3 between November 2019 and November 2021. The primary outcome was ED LOS. Secondary outcomes included consultation proportions, disposition status (i.e., admission or discharge), readmission, and Major Adverse Cardiac Events (MACE) within 30 days of the index ED visit. Statistical significance for the secondary outcomes was set at $p < 0.001$ because of the multiple tests performed.

Results: Overall, a total of 4339 patient were included in similar 12-month study periods, with 2031 in the conventional troponin (cTn) group and 2308 in the hs-TnI group. The groups were similar; median age was 56 years and 52% were male. The median ED LOS was significantly reduced from 430 to 400 min after protocol implementation (median difference = 30; 95% CI: 12.3, 47.8). Among patients who were discharged and underwent serial troponin tests, there was also a significant decrease in LOS by 89 minutes (95% CI: 67.2, 110.8). Consultations were unchanged between the groups (21.2% cTn vs. 18.5% hs-TnI; $p = 0.03$). The proportion of patients discharged increased from 73% to 78% after implementation ($p = 0.0001$). At 30 days, there were no differences in hospital readmission (17.9% vs. 20.4%; $p = 0.04$) or MACE outcomes (8.1% vs. 9.4%; $p = 0.14$).

Conclusion: In this single-center study, the implementation of an ADP using hs-TnI was associated with decreased ED LOS and hospital admission for adult patients presenting with chest pain of cardiac origin. There were no substantial changes in consultation, hospital readmission, or adverse outcomes at 30 days.

Keywords: high-sensitivity cardiac troponin, length of stay, chest pain

PO005

Prevalence of pulmonary embolism among emergency department patients with acute exacerbations of chronic obstructive pulmonary disease (AECOPD): a linked administrative database study

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Introduction: The prevalence of pulmonary embolism (PE) among patients with acute exacerbations of chronic obstructive pulmonary disease (AECOPD) is understudied. Based on the variable prevalence of PE, some advocate investigating more patients with AECOPD for PE, including those who are admitted. We sought to evaluate the PE prevalence among patients presenting to the emergency department (ED) with AECOPD.
Methods: We used linked data from regional health and vital statistics databases. Information from adults presenting to six EDs in Alberta (only index visits) was retrieved over a 6-years period (from January 2015 to June 2021); patients with PE diagnosis before the ED visit were excluded. The study analyses were mainly descriptive and focused on summarizing investigations related to PE (D-dimer, ventilation-perfusion [VQ] scan, and/or computed tomography pulmonary angiogram [CTPA]), admission status, diagnosis of PE in the ED or during hospitalization, and 30-day outcomes including ED return visits and all-cause mortality.
Results: Of the 25,510 patients with a primary or secondary diagnosis of AECOPD, 12,185 (48%) patients (median age 70 years, 50% males, 46% hospitalized) met the inclusion criteria. Of the included patients, 2072 (17%) were investigated for PE: 84% had a D-dimer, 44% had a chest CT and 2% had VQ performed. Overall, 68 (0.5%) patients received a diagnosis of PE; 41 (0.3%) received a co-diagnosis in the ED and 27 (0.2%) patients received a primary PE diagnosis while hospitalized. Post ED outcomes included 855 (7%) who returned within 30 days and 490 (4%) who died within 30 days; there were no statistically significant differences between those investigated and not investigated for PE for any of these outcomes.
Conclusion: Although one in six patients with AECOPD were investigated for PE in the ED setting, the prevalence of PE was less than 1% in this cohort. While acknowledging PE may occur concurrently with AECOPD, clinicians should be cautious to avoid over-investigation for PE, which delays flow, increases costs, and may be harmful to patients. Pathways using selective investigations (e.g., age-adjusted D-dimer cut-offs for PE) have the potential to decrease overuse of health care resources.
Keywords: acute exacerbations of chronic obstructive pulmonary disease, pulmonary embolism, emergency department

PO006

Predictors of investigations for pulmonary embolism among patients presenting to the emergency department with acute exacerbations of chronic obstructive pulmonary disease (AECOPD): An approach to streamlining care

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Introduction: Presentations to the emergency department (ED) for acute exacerbation of chronic obstructive pulmonary disease (AECOPD) are common. Although as many as one in six patients with AECOPD are investigated for pulmonary embolism (PE) in the ED, little is known about factors that are associated with investigation. We sought to explore predictors for PE investigations among patients with AECOPD seen in the ED.
Methods: We conducted a retrospective cohort study of adults presenting with AECOPD to six EDs in Alberta between January 2015 and June 2021. We analyzed information on demographics, comorbidities, ED investigations performed to rule out PE (D-dimer, ventilation-perfusion [V/Q] lung scans, and computerized tomography [CT]), and operational and clinical outcomes from provincial administrative health data. We performed a multivariable logistic regression (MLR) to identify predictors of investigations for PE among patients with AECOPD.
Results: There were a total of 12,185 unique patients with AECOPD included over the 6-yeasr study period. The median age was 70 years and 50% were male. Among those who underwent further investigations for PE (n = 2072), 84%, 44%, and 2% received D-dimer testing, a CT scan, and a VQ scan, respectively. Overall, 41 (0.3%) patients were diagnosed with a PE in the ED. In the MLR model, the following factors were significantly associated with ED PE investigations: presentation with any chest pain (aOR = 2.74; 95% CI: 2.27–3.32) or shortness of breath (aOR = 1.30; 95% CI: 1.14–1.50), CTAS scores 1 or 2 (aOR = 1.15; 95% CI: 1.04-1.28), and a history of cancer (aOR = 1.37; 95% CI: 1.20–1.57) or venous thromboembolism (aOR = 1.57; 95% CI: 1.25–1.98). Several factors were significantly associated with less frequent PE investigations including older age (aOR = 0.99; 95% CI: 0.98–0.99), EMS arrival (aOR = 0.83; 95% CI: 0.75–0.92), presentation with cough/congestion (aOR = 0.58; 95% CI: 0.47–0.71), evening presentation (aOR = 0.81; 95% CI: 0.73–0.90), and a history of congestive heart failure (aOR = 0.74; 95% CI: 0.64–0.85).
Conclusion: The overall prevalence of PE among patients presenting to the ED with AECOPD was less than 1%. Despite a high proportion of patients undergoing advanced imaging for PE, the results suggest that information readily available at examination could guide investigations. This might be a cost-effective and safe strategy to prevent unnecessary imaging, especially in patients with low probability of PE.
Keywords: pulmonary embolism, chronic obstructive pulmonary disease, emergency department

PO007

BRISK-ED: balanced crystalloids (RInger's lactate) versus normal saline in adults with diabetic ketoacidosis in the emergency department: a pilot randomized controlled trial

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Introduction: Diabetic ketoacidosis (DKA) is a life-threatening condition requiring treatment with intravenous (IV) insulin and fluid. Current guidelines recommend using normal saline (NS); however, NS may delay DKA resolution by causing hyperchloremic metabolic acidosis whereas balanced crystalloids do not. This study's objective was to determine the feasibility of a future trial comparing IV Ringer's Lactate (RL) versus NS in treating emergency department (ED) patients with DKA.
Methods: This is a single-centre pilot randomized controlled trial (RCT) of adults ($\geq$ 18 years) presenting to **an academic tertiary care ED** with DKA. The primary feasibility outcome was recruitment rate, and the primary efficacy outcome was **time elapsed from ED**

presentation to DKA resolution (defined by the American Diabetes Association Consensus Statement on Hyperglycemic Crises). Patients with clinical suspicion for DKA were screened and those found to not meet DKA criteria were excluded. **Enrolled patients were randomized 1:1 to receive IV RL or NS. Patients, clinicians, and outcome assessors were blinded to allocation group.** Gehan-Wilcoxon, Mann-Whitney U, or chi-square tests were used to compare groups as appropriate.
Results: We included 52 patients (25 RL, 27 NS) over 14 months, meeting our target recruitment rate. 26 (50.0%) had type 1 diabetes, 22 (42.3%) had type 2 diabetes, and 4 (7.7%) had no diabetes history. Median (IQR) age was 46 (25–63) years, and 21 (40.4%) were female. Mean (SD) volume of fluid administered was 1475 $\pm$ 754.8 mL. For the 44 patients with confirmed laboratory evidence of resolution, median (IQR) time to DKA resolution for RL vs NS was 15.7 (10.4–18.8) and 12.7 (7.9–19.2) hours, respectively ($p = 0.12$). Overall, median (IQR) time to insulin infusion discontinuation was 15.9 (5.7–39.2) versus 15.5 (6.7–36.4) hours for RL and NS, respectively ($p = 0.96$). The proportion of adverse events (composite of death, intensive care admission, intubation, and major adverse kidney events at 30 days) did not significantly differ between groups (28.0% vs 14.8% in RL vs NS groups, $p = 0.24$).
Conclusion: Although not powered to detect clinical differences between groups, this pilot RCT demonstrated the feasibility of our protocol by meeting our target recruitment rate. Our results may be used to inform future multicentre trials to compare the safety and efficacy of RL and NS in treating DKA.
Keywords: diabetic ketoacidosis, randomized controlled trial, balanced crystalloids

PO008

High-dose cephalexin for cellulitis: a pilot randomized controlled trial

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Introduction: Cellulitis is one of the top 10 reasons to visit a Canadian Emergency Department (ED). The current treatment failure rate is approximately 20%. Evidence is lacking regarding optimal outpatient management of cellulitis. The objective was to evaluate the feasibility of a randomized trial comparing high-dose (1000 mg) to standard-dose (500 mg) cephalexin to treat ED patients with cellulitis.
Methods: We conducted a parallel arm double-blind randomized controlled pilot trial at two Canadian EDs. Eligible participants were adults (age $\geq$ 18 years) with non-purulent cellulitis and determined by the treating emergency physician to be eligible for outpatient oral antibiotics. Participants were randomized to high-dose or standard-dose cephalexin four times daily for 7 days. The primary feasibility outcome was participant recruitment rate (target $\geq$ 35%). The preliminary primary effectiveness outcome was oral antibiotic treatment failure, defined as a change in antibiotic (change in class of oral antibiotic or escalation to intravenous therapy) within 7 days due to worsening infection. Worsening infection was defined as any of the following: (i) new or persistent fever; (ii) increasing area of erythema $\geq$ 20%; or (iii) increasing pain $\geq$ 2 points using the Numeric Rating Scale. The target sample size was 64 patients across both sites over six months, which was based on the primary feasibility outcome of recruitment. Analysis was conducted according to an intention-to-treat principle.
Results: Of 134 eligible participants approached for trial participation, 69 (51.5%, 95%CI 43.1% to 59.8%) were recruited and randomized. After excluding three randomized participants due to an alternate diagnosis, a total of 33 participants were included in each arm. Nineteen eligible cases (14.2%) were missed. Loss to follow up was 6.1%. Treatment failure occurred in four patients (12.9%) in the standard-dose arm versus one patient (3.2%) in the high-dose arm. A greater proportion had minor adverse events in the high-dose arm. No patients had an unplanned hospitalization within 14 days.
Conclusion: This pilot randomized controlled trial comparing high-dose to standard-dose cephalexin for ED patients with cellulitis demonstrated a high recruitment rate and that a full-scale trial is feasible. High-dose cephalexin had fewer treatment failures but with a higher proportion of minor adverse effects and shows promise in avoiding intravenous therapy.
Keyword: cellulitis

PO009

Test characteristics of point-of-care ultrasound for the diagnosis of acute cholecystitis: a systematic review and meta-analysis

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Introduction: Acute cholecystitis (AC) accounts for up to 9% of hospital admissions for acute abdominal pain and best practice is early surgical management. Ultrasound is the standard modality used to confirm diagnosis. Our objective was to perform a systematic review and meta-analysis to determine the diagnostic accuracy of emergency physician-performed point-of-care ultrasound (EP-PoCUS) for the diagnosis of AC.
Methods: We completed a systematic review, registered in PROSPERO, adhering to PRISMA guidelines. Medline, Embase, Web of Science, Scopus, Cochrane Library and select conference abstracts were searched from inception to October 2022 by a registered librarian. The search strategy was verified by a second librarian.
We included English studies that enrolled adult patients with clinical suspicion of AC, who received EP-PoCUS. The reference standard for AC was surgical pathology, then radiology-performed ultrasound if no surgical pathology was available. Identified titles were imported into Covidence, and duplicates were removed. Two reviewers (SW, JS) independently assessed study eligibility by title/abstract, and possible full manuscripts underwent data extraction and risk of bias (QUADAS-2) assessment. Conflicts were resolved by consensus with a third reviewer (RT). Data were extracted from eligible studies to create 2×2 tables for diagnostic accuracy meta-analysis. Hierarchical Summary Receiver Operating Characteristic models were constructed.
Results: Of 1256 abstracts, 38 were selected for full-text review. Nine studies ($n = 2008$) were included. EP-PoCUS had a pooled sensitivity of 77.9% (95% CI 65.2–86.9), specificity of 94.0% (95% CI 88.1–97.1), positive LR of 13.0 (6.5–25.9), and negative LR of 0.24 (0.14–0.38) for the diagnosis of AC. There was a risk of bias identified in the reference standard domain.
Conclusion: EP-PoCUS has high specificity and negative predictive value for the diagnosis of AC in patients with clinical suspicion. This review supports the use of EP-PoCUS to expedite the diagnosis of AC in the emergency department.
Keyword: point of care ultrasound

PO010

Use of fixed-wing modified scene air ambulance responses for injured patients in Northern Ontario: a pilot study

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Introduction: Timely access to a lead trauma hospital (LTH) can save lives. Paramedics in Ontario use the field trauma triage standard (FTTS) to identify patients that should bypass a local hospital and proceed directly to an LTH or when to request a rotor-wing scene response. The vast geography of Northern Ontario creates a barrier to equitable access to an LTH. Many communities are outside the rotor-wing response coverage area and only accessible by fixed-wing air ambulance. In 2016, Ornge began working with ambulance services to introduce the concept of having land paramedics request a fixed-wing modified scene response (MSR) for patients who met the FTTS to decrease the time to definitive care for injured patients in the north. This study aimed to: (1) explore the impact of fixed-wing MSR pilot program on the time to trauma center arrival for injured patients in Northern Ontario compared to the traditional interfacility transfer (IFT) process, and (2) determine the frequency and specific FTTS criteria that were fulfilled.
Methods: This was a retrospective cohort study of injured patients in Northern Ontario who were emergently transported to an LTH by Ornge between January 2016, and October 2021. Electronic patient care records were manually reviewed and patient cases were grouped by their sending and receiving facilities. Sending-receiving facility pairs were then used to evaluate time differences between MSR and IFT.
Results: A total of 124 patients met inclusion criteria during the study period (median age 45.5 years, 86% male). For same-distance transports, the average time from injury to arrival at the trauma center was 292.8 min for MSR and 507.8 min for IFT, with a median difference of 130.3 min (IQR = 257.75, 85.4-343.15). All (100% [n = 12]) of MSR and 90% (n = 110) of IFT met at least one FTTS criterion. The most frequent criteria met were GCS < 14 (37.7%), age > 55 years (36.1%), and high-risk auto crash (32.8%).
Conclusion: Fixed-wing MSR improves access to timely definitive care for injured patients in Northern Ontario, and all patients transported in this pilot project met trauma bypass criteria. Despite training local paramedic services and community hospitals on MSR protocol, there has been poor uptake of the program. Future efforts should focus on continuing education to local stakeholders, expanding the program to other remote communities, and exploring in-hospital patient outcomes to better define the benefits of a fixed-wing MSR.
Keywords: air ambulance, interfacility transfer, modified scene response

PO011

Bridging the gap: a qualitative assessment of multi-disciplinary emergency service provider's experience with patients experiencing methamphetamine induced behavioural disturbance

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Introduction: Methamphetamine induced behavioral disturbance (MIBD) is an increasingly prevalent presentation in Emergency Departments (EDs) but little research has been conducted on this topic. Even fewer studies have assessed the experience of care providers and their interactions with these clients. This study examined multidisciplinary emergency provider's experiences, feelings, and perceived challenges when working with patients experiencing MIBD. The goal is to identify areas for improvement of care, and support policy that will improve staff and patient safety.
Methods: Physicians, nurses, paramedics, protection services, police officers and social workers were recruited to complete an anonymous, online, mixed methods survey. The survey was created on Qualtrics software using interdisciplinary focus groups and pilot testing. Questions included quantitative data and free text questions. Following ethics approval, the survey was distributed through posters and email to four hospitals and all emergency services in a major Western Canadian city. Responses are undergoing thematic analysis utilizing NVivo software by two authors which will be audited by a third. Triangulation of results will be achieved using peer debriefing. Qualitative results will be compared to quantitative data.
Results: A total of 218 surveys were collected. Of the respondents 84% had felt unsafe and 83% had been harmed at some time during an encounter. Consensus showed that there was a lack of resources when providing care to these patients. The most commonly cited were staffing (66%), burnout (64%), and lack of addictions resources (58%). Despite this, empathy and a belief that this marginalized population deserved optimal health care was a predominant opinion across all providers. Preliminary qualitative analysis has shown themes such as safety concerns, a need for more support, patient advocacy and moral distress.
Conclusion: This study provides important context from a vital subset of stakeholders who have previously gone under-recognized regarding MIBD management in the ED. These providers have valuable input from experience and have retained a great deal of empathy for their patients; their feedback should be used to inform practice, public policy and to encourage further research into this underserved and important area of emergency medicine.
Keywords: emergency services, methamphetamine, behavioural disturbance

PO012

A five-year chart review of 'community emergency' patients presenting to the emergency department in Carbonear, NL

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Introduction: In Newfoundland and Labrador (NL), a patient presenting to the Emergency Department (ED) with no apparent acute medical diagnosis is labeled a 'community emergency' (CE). Social factors or functional limitations often prevent these patients from safe discharge, yet hospital admission for acute medical reasons is not warranted. These patients are held in the ED until a suitable placement or support system is arranged. They are at risk of potential deterioration during their stay. This study describes the characteristics, adverse events, health outcomes, and disposition of patients $\geq$ age 65 presenting to the ED as 'CEs'.
Methods: A retrospective chart review was conducted of CE patients $\geq$ age 65 years presenting to the ED at Carbonear General Hospital between January 1, 2017 and December 31, 2021. Variables collected included age, gender, length of stay, adverse events in hospital, disposition and mortality, amongst others. Descriptive statistics were used to describe collected variables.

Results: One hundred charts were identified as CEs. There was an equal division of sexes and the average age was 80.2 years (SD = 8.2). Most (96%) patients were triaged as Canadian Triage and Acuity (CTAS) 3 and higher and had a family doctor (88%). On presentation, 76% of patients lived at home. In the ED, adverse events included four patients (4%) experiencing a fall, nine patients (9%) developing delirium and 25 patients (25%) developing new/worsening symptoms. The average length of stay in the ED was 2.0 days (SD = 3.1, range 0-22). From the ED, 37 (37%) patients returned home with additional supports, 21 (21%) were admitted to hospital, 12 (12%) went to personal care homes and 21 (21%) to long-term care. Following ED presentation, mortality was 9% at 30 days, 23.4% at 6 months and 35.4% at one year.
Conclusion: CEs tend to be older adults presenting from the community with unmet care needs in their current living situations. While held in the ED, these patients are at risk of, and do experience a significant rate of adverse events. Our results identify, begin to quantify and bring awareness to the high morbidity and mortality associated with this population and the need to improve their care, both in the community and during ED visits.
Keywords: geriatrics, retrospective cohort, emergency medicine

PO013

Development of a nationwide out-of-hospital transfusion protocol: a modified RAND Delphi study

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Introduction: Early resuscitation with blood components or products is emerging as best practice in select trauma and medical patients. As a result, out-of-hospital transfusion (OHT) programs are being developed based on limited and often conflicting evidence. This study aims to provide guidance on the development of OHT protocols to Canadian Critical Care Transport Organizations (CCTOs).
Methods: We used a modified RAND Delphi process to achieve consensus on statements guiding various aspects of OHT in the context of critical care transport. Purposive sampling assured a representative distribution of participants in regards to geography and relevant clinical specialties. We conducted two written survey Delphi rounds, followed by a virtual panel discussion. Statements which did not achieve consensus in the first two rounds, defined as a median score of at least six on a seven-point Likert scale, were discussed and voted on during the panel discussion.
Results: Seventeen subject experts participated in this study between July 2021 and June 2022. All participants completed the three Delphi rounds. After the study process was completed, a total of 39 statements were agreed upon, covering the following domains: general oversight and clinical governance, storage and transport of blood components and products, initiation of OHT, types of blood components and products, delivery and monitoring of OHT, indications for and use of hemostatic adjuncts, and resuscitation targets of OHT.
Conclusion: This expert consensus document provide guidance on OHT best practices. These consensus statements will support efficient and safe OHT in national and international critical care transport programs.
Keywords: blood transfusion, air ambulance, trauma

PO014

Knowledge translation in medical education: generating education-advancing tools through a resident-engaged process

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Innovation Concept: Entrustable Professional Activities (EPAs) are a relatively new assessment method for Emergency Medicine (EM) trainees, with various barriers to their use. A recent multi-centre qualitative study by Paterson et al. identified strategies that may help increase EPA acquisition in EM. Importantly, they found that behavioural patterns and environmental factors had the greatest influence on EPA acquisition. For example, having an understanding of EPA descriptions assists with acquisition, as does setting EPA goals prior to shift.
Knowledge translation (KT) of any research, let alone medical education research, is notoriously difficult. We aimed to develop an education innovation that engaged end-users (residents) in developing tools that would help them adopt the findings from Paterson's work and ultimately improve their EPA acquisition.
Methods: The population for this education innovation is McMaster University RCPSC EM residents PGY1-5. A needs assessment demonstrated that a digitally accessed infographic was the preferred method for the KT tool. Additionally, residents were interested in an in-person session at the start of residency to orient them to the tool. Version 1 of the infographic was emailed to participants in January 2023. The infographic will then be refined through multiple rounds of iterative participant-engagement processes.
Curriculum, Tool or Material: Focusing on environmental and behavioural modification, our goal is to translate knowledge from a qualitative data analysis to practical tips that residents can use daily. The current innovation focuses on tangible, modifiable factors that can empower individual residents in their EPA acquisition. Using Google Slides, the authors designed an infographic reflecting key messages from Paterson's findings. This will be saved as a PDF and distributed to residents via email. Through our process we will engage residents in determining what other augmentation tools we can use to better translate the research findings into meaningful participant-oriented materials.
Conclusion: We describe a resident-engaged process for translating medical education research findings. Our process generated a resident-centered tool to assist EM residents with EPA acquisition.
Keywords: innovations in emergency medicine education, knowledge translation, entrustable professional activity

PO015

Application of the Modified Early Obstetrical Warning System (MEOWS) in postpartum patients in a Canadian emergency department

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Introduction: In Canada, emergency department (ED) utilization among postpartum patients is high, partially attributable to limited ambulatory obstetrical care access during the postpartum period. Although timely identification of acute illness can be difficult, it is key to preventing adverse outcomes in this vulnerable population. The

Modified Early Obstetric Warning System (MEOWS) is a risk stratification tool designed to predict severe maternal morbidity (SMM) and mortality and has been validated for use in obstetrical wards. The objective of this study was to determine if MEOWS could accurately identify patients at risk of severe maternal morbidity (SMM) and mortality in the ED setting.
Methods: We conducted a retrospective chart review of patients presenting to an academic tertiary care centre (annual ED census 65,000) with a postpartum complaint within six weeks of delivery between May 2020 to March 2022. The exposure was the presence of a trigger, defined per MEOWS as one severely abnormal (red) or two mildly abnormal (yellow) physiological measurements during the ED assessment. The diagnostic accuracy of the tool to identify patients at risk of SMM or mortality was estimated by calculating the sensitivity (SENS), specificity (SPEC), positive predictive value (PPV) and negative predictive value (NPV).
Results: Of 267 patients included, 21 (7.9%) met the criteria for SMM. 'Severe preeclampsia and eclampsia' was the most common outcome of SMM, representing 16 (76.2%) cases. There were no maternal deaths. Overall, the SENS of the MEOWS tool was 85.7% (95% CI: 63.7–97.0%), SPEC was 67.9% (95% CI: 61.7–73.7%), PPV was 18.6% (95% CI: 15.1–22.7%), and NPV was 98.2% (95% CI: 95.1–99.4%). Most patients (86.5%) were discharged directly from the ED, and 90.0% did not return within 30 days.
Conclusion: This study is the first to explore the utility of MEOWS in the ED. MEOWS may be a valuable tool to identify patients with acute illness who are at risk of SMM and mortality in the ED setting.
Keywords: postpartum complications, preeclampsia, clinical decision aids

PO016

Updated relevance of the Choosing Wisely Canada recommendations for emergency medicine

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Introduction: The Choosing Wisely Canada (CWC) database contains recommendation lists created by various specialty organizations to reduce low-value testing and clinical care. Many of these lists contain items relevant to the practice of Emergency Medicine (EM). This project updates prior work identifying such recommendations.
Methods: The original project rated EM-relevance of CWC recommendations available in March 2019. The most recent list of complete recommendations was downloaded from the CWC website (summer 2022). Newer recommendations (since 2019) posted by various specialty organizations were retrieved, and were rated again using the previously validated Best Evidence in Emergency Medicine (BEEM) 7-point Likert rating scale. Community EM physicians (trained in use of the BEEM rating scale) independently rated the retrieved updates using an online survey instrument. Items rated as "must-know" (7/7) or important for "most" EM physicians (6/7) were collated.
Results: A total of 91 new items were included for ratings analysis. Five physician raters identified 9 relevant recommendations (total 10%; 1 item scored 7/7, 8 items scored 6/7 [9%]). No new duplicated items were identified from those previously rated.
Conclusion: This ongoing project updates identification of EM-relevant recommendations in the growing CWC database. These items can be used by EM physicians for future quality improvement initiatives in Canadian Emergency Departments, and obtain national CWC designation for their institutions.
Keywords: choosing Wisely Canada, emergency medicine, relevance

PO017

Needs assessment for standardized trauma carts in the Emergency Department

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Introduction: Dedicated equipment carts in the Emergency Department have been shown to improve operational efficiency and clinical outcomes (eg. Difficult airway, orthopedic supplies, wound care). A prior Scoping review has shown some potential benefits for creating a Trauma cart with appropriate supplies for local needs. This project continues the needs assessment phase of creating standardized Trauma carts in Niagara region.
Methods: A survey of potential trauma cart contents was created using available literature, Scoping review results and local expert opinion. The survey was distributed to all ER physicians and nurses for feedback and input. Ample comment space was left for each proposed section of the cart, and at the end of the survey to maximize feedback and suggestions. Ethics waiver was received and all responses were submitted anonymously. Responses were pooled and descriptively analyzed in order to prioritize equipment needs for proposed carts.
Results: There was strong support for creating standardized trauma carts for regional use. "Strongly endorsed" desired equipment included basic and advanced wound care and major bleeding, peripheral vascular access trays (including intraosseus access), pneumothorax tray (including chest tubes), and orthopedic splints/casting supplies. "Variably endorsed" equipment included difficult airway devices, central lines/cordis catheters, burn dressings, thoracotomy and pericardiocentesis tray, gynecologic speculums and traumatic caesarian section trays. "Not endorsed" equipment included cranial burrholes and intra-abdominal cavity packings.
Conclusion: There is strong support for creating standardized trauma carts across Niagara regional Emergency Departments. There is growing consensus on equipment that is necessary to manage the majority of trauma patients using these carts. This work will inform future trauma cart assembly, training/education exercises and implementation across multiple sites.
Keywords: trauma cart, emergency department

PO018

Developing predictive models for abnormal high-sensitivity troponin using logistic regression and machine learning

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Introduction: Chest pain accounts for 5–7% of all emergency department (ED) visits. Although the advent of troponin testing has aided clinicians to more promptly diagnose myocardial infarctions,

there are commonly long delays in drawing bloodwork and obtaining troponin results. Our primary objective was to develop and compare logistic regression (LR) with machine learning (ML) models for abnormal high-sensitivity troponin (hsTnI). Our secondary objective was to create a clinical decision score (CDS) for abnormal hsTnI based on the multivariable LR model developed.

Methods: We designed a retrospective cohort study enrolling atraumatic chest pain patients at the EDs of the Civic Hospital and General Hospital in Ottawa, Ontario from November 27th 2019 to January 8th 2020. Adults ($\geq$ 18 years of age), presenting with a primary complaint of atraumatic chest pain to the ED and having a hsTnI drawn on the visit were enrolled. Data on patient demographics, initial ED course, past medical history, medication history, vital signs, history of presenting illness, ECG characteristics, hsTnI values, coronary angiogram results performed on index ED visit and final diagnoses were obtained from patients' individual electronic charts by one of four data abstractors. As per the manufacturer's recommendations, we used a cut-off of $>$ 14ng/L for a hsTnI to be considered abnormal. LR models were internally validated using bootstrapping. ML random forest modelling was done according to specific instructions, in isolation without knowledge of the LR models.

Results: Of the 1,538 patients presenting with chest pain over 43 consecutive days, 965 patients were retained of whom 226 had an abnormal hsTnI. The bootstrapped area under the curve (AUC) of the abnormal hsTnI models derived using LR and ML were 0.89 (95% CI: 0.87, 0.92) and 0.92 (95% CI: 0.90, 0.93) respectively. The Ultra-Low Risk Troponin Score (ULRTS) was developed. It has a 100.00% (95% CI: 98.38%, 100,00%) sensitivity for identifying ultra-low risk chest pain patients who are unlikely to have an abnormal hsTnI. In our study, 10.8% of included patients could have foregone hsTnI testing safely by applying the novel CDS.

Conclusion: LR and ML yielded comparable excellent models at predicting abnormal hsTnI. We envision that the ULRTS, once externally validated, will have the potential to allow physicians to forego hsTnI testing in ultra-low risk chest pain patients.

Keywords: chest pain, troponin, machine learning

PO019

Chest pain in emergency department patients: a comparison of logistic regression versus machine learning in predicting major adverse cardiac events

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Introduction: Chest pain is the second most common presenting complaint in patients presenting to the emergency department (ED). Myocardial infarction, the main diagnosis to rule out, requires rapid diagnosis and treatment to limit morbidity and mortality. Our primary objective was to compare logistic regression (LR) with machine learning (ML) in predicting which patients were at risk of major adverse cardiac events (MACE). Our secondary objective was to create a novel clinical decision score (CDS) for MACE prediction without the use of troponin.

Methods: We designed a retrospective cohort study enrolling atraumatic chest pain patients at the EDs of the Civic Hospital and General Hospital in Ottawa, Ontario from November 27th 2019 to January 8th 2020. Adults ($\geq$ 18 years of age), presenting with a primary complaint of chest pain to the ED and having an electrocardiogram (ECG) or high-sensitivity troponin drawn on the visit were enrolled. Data on patient demographics, initial ED course, past medical history, medication history, vital signs, history of presenting illness, ECG characteristics, troponin values, coronary angiogram results performed on index ED visit and final diagnoses were obtained by one of four data abstractors. LR models were internally validated using bootstrapping. ML random forest modelling was done according to specific instructions, in isolation without knowledge of the LR models. We used a seven-point composite outcome of MACE within 6 weeks of index ED visit. Outcomes were verified by searching the electronic medical records of our institution.

Results: Of the 1538 patients presenting with chest pain over 43 consecutive days, 1014 patients were retained of whom 70 suffered a MACE. Internally validated LR and ML models for MACE achieved similar area under curve (AUC): 0.89 (95% CI: 0.87, 0.93) and 0.92 (95% CI: 0.89, 0.94) respectively. A novel CDS, that can predict MACE without the use of troponin, was derived: the Preliminary Chest Pain Risk Score (PCPRS) with a sensitivity of 100.00% (95% CI: 94.87%, 100.00%) and a specificity of 47.67% (95% CI: 44.44%, 50.91%) for identifying low risk chest pain patients. In our study, 44.4% of included patients would have been categorized as low-risk using the PCPRS.

Conclusion: LR and ML both yielded comparable excellent models at predicting MACE. Future prospective studies will be required to externally validate the novel MACE clinical decision score.

Keywords: chest pain, clinical decision score, artificial intelligence

PO020

Choosing Wisely in pediatric emergency medicine: five opportunities to improve value and outcomes

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Introduction: Over-testing is common for children cared for in emergency departments (EDs) and leads to waste and potential harm. Choosing Wisely (CW) organizations in the U.S. and Canada strive to reduce unnecessary tests and treatment. A task force of U.S. and Canadian pediatric emergency medicine (PEM) physicians was formed to create the first CW recommendation list for children in EDs.

Methods: The task force surveyed a diverse group of ED providers from 6 pediatric EDs to collect suggested recommendations. After duplicate items were removed, task force members independently scored items based on perceived frequency of overuse, strength of evidence, and potential harm with overuse. The 25 highest-rated items were sent in a survey to 89 PEM physicians in the U.S. and Canada who were members of the American Academy of Pediatrics Committee on Quality Transformation. Participants selected their top 10 recommendations. Items already present in other specialty CW lists were removed. The 5 most frequently chosen items became the final PEM CW list. The list was then circulated to $>$ 100 specialty groups (within the AAP, CAEP, CW Canada, and CW USA) for review and approval prior to release.

Results: A total of 205 suggested items were collected. Seventy-two non-duplicative items were scored to create the top 25 item survey. The survey had a 63% response rate. Two items were removed based on similarity to existing items on other CW lists. The final 5 items were published by CW USA and CW Canada on December 1, 2022. These five items were: (1) Do not obtain radiographs in children with bronchiolitis, croup, asthma or first-time wheezing; (2) Do not obtain screening laboratory tests in the medical clearance process of pediatric patients who require inpatient psychiatric admission unless clinically indicated; (3) Do not order laboratory testing or a CT

scan of the head for pediatric patients with an unprovoked, generalized seizure or a simple febrile seizure who have returned to baseline mental status; (4) Do not obtain abdominal radiographs for suspected constipation; (5) Do not obtain comprehensive viral panel testing for patients who have suspected respiratory viral illness.
Conclusion: A multinational PEM task force used a structured process to develop the first CW list for pediatric patients in the ED setting. Future activities will include dissemination of the list and development of quality improvement activities to align care with the recommendations.
Keywords: appropriateness, over-testing, quality

PO021

Development of a substance use disorder educational intervention for nurses in the emergency department – a needs assessment survey

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Introduction: Patients with substance use disorders (SUD) constitute up to 1 in 11 emergency department (ED) visits in North America and this number increasing throughout the COVID-19 pandemic. The ED presents an excellent opportunity to intervene and improve care for patients with SUDs, however there is currently no required or expected level of competence in managing SUDs for registered nurses (RNs) working in an emergency setting. To inform an educational intervention for improving nursing care for patients with SUDs, this study aimed to understand the current competency and confidence amongst ED RNs and identify gaps which should be addressed through continuing education.
Methods: This was a cross-sectional survey of ED RNs at an academic, inner-city tertiary-care centre (annual ED census 65,000 patients). Participants were asked up to 13 questions pertaining to their level of nursing experience, training in the management of SUD, comfort in the management of patients with SUD, perceived barriers to providing effective care for patients with SUD, and preferred topics for future continuing education.
Results: 35 RNs completed the survey, 48.6% of whom were in their first five years of nursing practice. Only 20% of respondents reported having previously received continuing education for SUD, the most common domains covered being bias, stigma, and general mental health. On a five-point Likert scale, nurses reported only moderate confidence (mean $= 3.23$) in their ability to care for patients with SUDs, and low confidence (mean $= 2.80$) in their ability to counsel patients on harm reduction resources. 26 (74.3%) respondents respectively identified a lack of previous education on SUD management and inadequate post-discharge resources as the primary barriers to providing effective nursing care. All respondents expressed interest in continuing education. Topics for future continuing education which were perceived as being most beneficial include education on general SUD (pathophysiology, pharmacology, crucial conversations) as well as education on community and internal resources such as rapid-access addiction management clinics.
Conclusion: Our survey of RNs working in an ED with a high volume of patients with SUDs, we found low levels of formal education related to SUD management. Participants reported a moderate to low degree of confidence in their ability to manage and counsel patients with SUDs, and unanimous interest in further education about this topic.
Keywords: substance use disorder, nursing

PO022

Implementation of the Canadian Syncope Pathway: a pilot non-randomized stepped wedge trial

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Introduction: We developed the Canadian Syncope Pathway (CSP) based on the Canadian Syncope Risk Score (CSRS) to aid emergency department (ED) syncope management. This pilot implementation study assessed patient inclusion, length of transition period, process measures and outcomes to prepare for multicentre implementation.
Methods: A non-randomized stepped wedge trial at two hospitals was conducted over 7 months. After 2–3 months in the control condition, the hospitals crossed over in a stepwise fashion to the intervention condition. Study participants were ED and non-ED physicians, and patients (aged $\geq$ 18 years) with syncope. The intervention was CSP implementation integrated into electronic health records. We analyzed patient characteristics, ED management, and outcomes for both periods and CSRS recommendations application during the intervention. Ethics approval was with waiver of consent. Our targets were 95% inclusion rate, 70% adoption, 60% reach and 70% fidelity for all eligible patients. (NCT04790058).
Results: 1002 eligible patients (mean age 56.6 years; 51.0% males) were included: 349 patients during the control period and 653 patients during the intervention period. Physician engagement varied from 39.7 to 97.1% for presentation at meetings. Process measures for the first month and the end of the intervention were: adoption (proportion of physicians who applied the pathway) 70.7% (58/82) and 84.4% (103/122), reach (intervention applied to eligible patients) 67.5% (108/160) and 55.0% (359/653), fidelity (appropriate recommendations application) among patients with physician data form completion 86.3% (88/102) and 88.3% (294/333), versus fidelity among all eligible patients 83.8% (134/160) and 83.3% (544/653) respectively with no significant differences in fidelity at one month and the end of the intervention period. Comparing outcomes between the control and intervention periods, ED consultations (12.7% vs. 11.2%), hospitalizations (20.1 % vs. 16.7%), and median ED disposition time (4.8 h vs. 4.7 hours) decreased, and arrhythmia detection improved from 1.4–2.8% (no statistical testing as recommended by the CONSORT statement).
Conclusion: In this pilot study, we achieved all prespecified benchmarks for proceeding to the multicentre implementation except reach. Results indicate one-month transition period will be adequate though regular reminders will be needed to improve reach. There was a trend towards improved resource utilization and arrhythmia detection.
Keywords: implementation, syncope, Canadian Syncope Risk Score (CSRS)

PO023

What if scientific knowledge translation tools were transformed into artistic experiences? An exploratory mixed method study comparing a circus show on rural health services in Québec to traditional knowledge translation tools

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Introduction: Traditional methods of knowledge transfer (KT) are well entrenched in the research culture. However, they are suboptimal

when it comes to reaching stakeholders around complex public health issues. To overcome this problem, a growing number of scholars are turning to arts-based knowledge transfer (ABKT) as they can cross individual abilities and navigate complex systems.
Methods: Since there are no studies has compared traditional KT with ABKT methods, our objective was to compare the impact of a circus show with a study report and a webinar pertaining to Kukkonen's brokering goals of awareness, accessibility, engagement, advocacy/policy influence and enjoyment. The three KT methods translated the same research on rural health services (UR360). Using questionnaires, discussion groups and individual interviews, this exploratory convergent mixed method study randomly assigned 107 participants to one of the three interventions. Quantitative data was analyzed using SAS descriptive statistics and inductive thematic analysis (Nvivo) was used for qualitative data with an equivalently driven data integration using enhancing and corroborating strategies.
Results: There were no significant differences between interventions on self-reported knowledge, feeling concerned about rural health care issues or feeling equipped or motivated to change the situation in a rural setting on the Likert-scale inquiries. However Participants in the show intervention reported being more intellectually stimulated, experiencing greater level of attention and feeling moved compared to the other two groups. Furthermore, a significant number of participants from the show intervention qualified the activity as "very pleasant" and a larger number would recommend this scientific communication activity to someone else. Finally, all of participants in the show group reported their intervention can help make scientific research accessible compared to 70.0% for the webinar and 40.7% for the report. To the question: "Do you believe that an artistic production can be a scientific communication tool?", 94.2% responded in the affirmative across three conditions.
Conclusion: Our study reports that an ABKT tool such as a circus show can attract, inform, engage, and mobilize diverse stakeholders. The investigation also sheds light on the purposes and limits of each intervention calling on the need to develop global, innovative, and diversified KT strategies engaging stakeholders, citizens and artists in a co-creative perspective.
Keywords: arts-based knowledge translation, rural health care services, circus arts

PO024

How many is too many? The association between consecutive emergency shifts, resource use, and patient outcomes in the ED

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Introduction: Medicine is a profession with long hours, difficult work, and stressful environments. This is associated with burnout, poor work-life balance, and staff dissatisfaction which might impact patient outcomes. One solution is to restrict the number of shifts physicians can work. However, if there is a tuning up phenomenon, and physicians improve over the short run with practice, restricting work could be counterproductive. We examine whether there are changes in productivity and patient outcomes associated with consecutive days of work for physicians.
Methods: We examine five emergency department (ED) sites within the Niagara Health system in Ontario, Canada. Consecutive shifts are compared with metrics of productivity (patients per hour), time resources (wait time, patient treatment time), and imaging resources (probability of ordering tests) of the ED physician. Patient outcomes are also measured as admissions to hospital and return to ED within 30 days (bouncebacks). We also provide raw estimates of effects as well as estimates adjusted for covariates.
Results: We find small increases in wait times of 1–3% and small declines in patient treatment times of 1–4%, but no impacts on patients seen by the physician per hour. We find reductions in the number of CT scans and x-rays ordered (8 and 2 percent from baseline, respectively). These changes occur over shifts two to four in sequence and resource allocation returns to baseline by shift six. We find no change in the probability of admission to hospital or bouncebacks within 30 days correlating to shift sequence. We also provide a back of the envelope calculation demonstrating effects on reduced department resource use by switching physicians to two to four consecutive shifts.
Conclusion: We find an optimal range or "sweet spot" during which there are reductions in resource utilization without compromise of patient outcomes as measured by admissions and bouncebacks. Importantly, these changes are transient over shifts two through four before returning to baseline by shift six. In aggregate, these effects add up to large improvements in efficiency, suggesting that EDs should be optimizing their schedules to take account of these resource efficiency improvements that occur when physicians work two through four shifts.
Keywords: shift scheduling, resource utilization, imaging use

PO025

Implementing longitudinal emergency medicine shifts for family medicine residents at a tertiary care hospital - pilot project

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Innovation Concept: Canadian urban Family Medicine residents have limited Emergency Medicine (EM) exposure. We implemented the first ever Tertiary Care longitudinal EM shift program in Canada to study the feasibility and effectiveness.
Methods: For the July 2021 to June 2022 academic year we recruited 7 FM residents with an interest in EM to work additional EM shifts throughout the year during non-EM blocks. The residents were surveyed and interviewed to evaluate the feasibility, effectiveness and barriers to implementation of these longitudinal shifts.
Curriculum, Tool or Material: Response rate of the survey was 100%. Residents enrolled for a variety of reasons: may practice in rural EM (57%), interested in CCFP-EM program (14%), wanted more EM exposure (14%), wanted more clinical exposure but not practicing EM (14%). 71% of residents found 0-2 as the optimal number of shifts/block. Family Medicine (100%), Peds ER (85.7%), Hospitalist (42.9%) were rated as most appropriate rotations to incorporate EM shifts. 57.2% felt it improved their clinical knowledge. 57% felt it impacted their interest in applying for the CCFP-EM program. 71% would recommend longitudinal shifts to a colleague. Qualitative themes derived from the survey and from individual interviews included: Perceived benefits such as greater exposure to emergent cases, increased exposure to procedures, increased exposure to staff allowing for greater independence with subsequent shifts, repeated exposure helped consolidate knowledge, allowed for continuous thinking about critical patients, can now understand ER patients when seeing in clinic. Strategies that worked well for scheduling included frequent emails to residents with open shifts, being able to self-schedule and that evening or weekends were easiest to work with clinic. Perceived strategies that would further facilitate scheduling included having shifts scheduled instead of other clinical

commitments, pre scheduling shifts with ability to reduce or increase closer to the time. Unexpected consequences of program included now considering a CCFP EM year, realized not interested in academic ER.
Conclusion: There are many perceived benefits to longitudinal ER shifts for family medicine residents based at tertiary care hospitals. Although barriers to implementation of these shifts exist, self-motivated residents who plan to practice in a rural setting or complete a CCFP EM year can benefit from these shifts. Targeted scheduling strategies can allow for successful implementation.
Keyword: innovations in emergency medicine education

PO026

A community-based participatory research study to evaluate an ED outreach worker program for people experiencing homelessness

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Introduction: People experiencing homelessness (PEH) have diverse and complex health and social needs with many barriers to accessing support. Many PEH experience poor health outcomes and increased healthcare utilization, especially in the emergency department (ED) for unmet health and social needs. To address these challenges, St. Michael's Hospital in Toronto, Canada co-designed the ED Outreach Worker Program with community partner organizations in the Downtown East Toronto Ontario Health Team. PEH presenting in the ED are connected to an ED outreach worker to identify and address immediate needs and facilitate safe discharge. In the weeks following discharge, the outreach worker helps the individual to navigate follow-up of health and social services and ensure connection to long term support.
Methods: A *3-phase* community-based participatory research study to develop a patient-reported experience measurement (PREM) tool to evaluate patient experience in the ED Outreach Worker Program. *Phase I*: Interviews with clients and staff/providers of the program to understand their current/past experiences with the program are conducted and analysed for themes. *Phase II:* Co-design of PREM tool by a team of lived experience partners, clients and staff/providers using results from Phase I. *Phase III:* Pilot test the tool from Phase II with current clients in the program.
Results: *Phase I:* Five clients and two outreach workers were interviewed. Participants emphasized the significant impact of the program on facilitating efficient access to housing and wraparound supports (e.g., case management, crisis care, legal services), providing client-centered care grounded in advocacy, empowerment, and respect for autonomy, and highlighted opportunities to expand and sustain the successes of the program. *Phase II:* In progress – results available in May 2023. *Phase III:* Planned for Summer 2023.
Conclusion: The PREM tool will be used for future evaluation of the ED Outreach Worker Program. This study will advance our understanding of the impact of ED-based interventions on patient experience and outcomes for PEH within an integrated healthcare system. Findings from this study will contribute to new knowledge of how to build effective partnerships among PEH and staff/providers in healthcare research and evaluation and provide further support for initiatives that will improve access, coordination, and navigation of care and services for vulnerable and disadvantaged populations.
Keywords: quality improvement and patient safety, homeless

PO027

Virtual co-design of a hospital-based violence intervention program

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Introduction: Hospital-based violence intervention programs (HVIPs) support individuals following violent injury. HVIPs prevent repeat violent injury, thereby preventing traumas seen in the emergency department (ED). We adapted an integrated knowledge translation approach with community-based participatory research principles to virtually codesign an HVIP at St. Michael's Hospital in Toronto, Ontario.
Methods: Our team engaged community members with lived experience of violence in a series of design thinking workshops on a virtual platform - Zoom. We collaborated to create an HVIP model with virtual tools: Zoom Whiteboard, which included drawing, writing, and chat functions; and Mentimeter, which included open boxes for typing responses, and voting on options presented to participants. Our approach was nested in community-based participatory research principles: (i.e., Participant compensation, integration of participant expertise emphasising their strengths). We met six times over 3 weeks to develop an HVIP model that is feasible, sustainable, and works in collaboration with existing municipal programs to provide a comprehensive violence prevention service.
Results: Our chosen virtual tools were effective, and facilitated participation in virtual co-design. As a result, we virtually created a HVIP model - THRIVE - that includes 'Coaches' - peer-based support workers with lived experience of violence. Coaches will meet with participants and support them in achieving their self-defined goals during their transition from hospital to community over several months, for up to a year. THRIVE is a novel community intervention, designed to support the individual who experienced violent injury, and their friends and family as well.
Conclusion: Having a virtual component to co-design has advantages: it can be more accessible to individuals who cannot attend physically. In the context of violence, having a neutral space for sharing can be an inclusive way to promote psychological safety. Shortcomings of this virtual approach include interrupted participation due to technology malfunctions, resulting in difficulty engaging with participants. A key component in co-design is to ensure participant engagement through diverse methods. In this respect, our findings align with previous studies demonstrating feasibility of adapting co-design to virtual platforms.
Keywords: hospital-based violence intervention program, co-design, violence prevention

PO028

Artificial intelligence-based decision support predicts requirement for neurosurgical intervention in acute traumatic brain injury: model development, validation and simulated prospective deployment

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Introduction: Artificial intelligence within the fields of acute brain trauma has focused predominantly on automated radiographic feature identification. Lesser emphasis has been placed on model development to aid clinical decision making. Once such critical decision is the transfer of traumatic brain injury (TBI) patients to appropriate tertiary care facilities. This pathway can be variable, inefficient and often non-standardized. No group has leveraged computed tomography (CT) based artificial intelligence methodology to predict the need for neurosurgical intervention for acute TBI. We aimed to develop an efficient and reliable automated triage method to predict neurosurgical intervention for brain-injured patients.
Methods: We utilized the Ontario Trauma Registry to identify TBI patients from 2005–2022 treated at St. Michael's Hospital (Toronto, Ontario). Model training, validation, and testing was performed using head CT scans with patient-level labels corresponding to whether the patient received neurosurgical intervention. These ground truth surgery labels were validated through manual case review. Following training and validation, the model was subsequently deployed in a simulated prospective fashion on all TBI patients presenting to our center over the 18-months between March 2021 and September 2022 to evaluate model performance.
Results: A dataset of 2806 brain scans were utilized for model training, validation and testing. An additional 612 consecutive patients were studied as a simulated prospective model deployment. The model performance for prediction of neurosurgical intervention demonstrated an area under receiver operating curve (AUC) of 0.92, accuracy of 0.87, sensitivity of 0.87, and specificity of 0.88 on the test dataset. Simulated prospective deployment resulted in an AUC of 0.89, 0.85 sensitivity, 0.84 specificity, and 0.84 accuracy.
Conclusion: We demonstrate the development, validation and simulated prospective deployment of a machine learning model that accurately predicts the need for neurosurgical intervention using a large trauma CT scan dataset. This model opens the door to application as a decision-support tool for emergency department physicians and neurosurgeons to optimize the efficiency of provincial TBI patient transfers to neurosurgical care centers.
Keywords: traumatic brain injury, computed tomography, artificial intelligence

PO029

Impact of alcohol intoxication on management of suicidality in the emergency department and subsequent effect on mortality

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Introduction: Suicide represents a significant worldwide disease burden disproportionately affecting younger patients in their prime working years. Mortality by suicide remains within the five leading causes of death up to the age of 60. Compounding this, alcohol use disorder (AUD) is known to be a risk factor for death by suicide and has been on the rise over the last 20 years, particularly during the COVID-19 pandemic. The emergency department (ED) is often the first point of health care contact for those patients that have suicidal thoughts or behaviours and understanding their acute risk of death by suicide when presenting intoxicated with alcohol remains a challenge for ED physicians. While the chronic disease of AUD elevates their lifetime risk for death by suicide, it has not been established how a presentation for suicidality accompanied by acute alcohol intoxication affects this risk.
Methods: This was a retrospective cohort study using population-based linked health administrative data for adult patients aged 18 or above who presented to Alberta EDs between 2011 and 2021 for suicidal attempt or self-harm behavior. Patients who were acutely intoxicated with alcohol were identified and analyses compared patients with and without alcohol intoxication. The primary outcome was 6-month death by suicide.
Results: Intoxicated patients were more likely to be placed under involuntary mental health hold (26% vs 16%) and had a longer median length of stay in the ED (411 min vs 277 min) but were less frequently admitted (10.8% vs 15.4%). Mortality due to suicide in the 6 months following the patient's index ED visit were similar between the intoxicated and non-intoxicated groups (0.3% vs 0.3%); however, there was a significant increase in all-cause mortality at 6 months in the non-intoxicated group (1.5% vs 2.1%; $p < 0.0001$).
Conclusion: This population-based study found that the 6-months risk of death by suicide was no different between those who presented with or without evidence of acute alcohol intoxication. These results provide new evidence for ED providers to consider when assessing the intoxicated patient with suicidal behaviours.
Keywords: suicide, alcohol intoxication, mortality

PO030

The role of visual abstracts in knowledge translation of clinical research information

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Introduction: Visual abstracts have become a popular method of disseminating new research data. Studies on the effectiveness of visual abstracts in increasing dissemination, awareness, and readership of research papers have been overwhelmingly positive. However, data on the effectiveness of visual abstracts in knowledge translation and knowledge retention by readers have been limited. The objective of our study is to determine whether visual abstracts improve knowledge translation of research findings compared to text abstracts amongst junior emergency medicine and internal medicine resident physicians.
Methods: A total of eight recent practice-changing landmark trial papers in emergency medicine and critical care medicine were selected by our group of experts, who then subsequently developed two multiple choice questions based on the paper's abstract. Visual abstracts for each of the eight papers were created by the research team. First and second-year residents in emergency medicine and internal medicine were emailed a questionnaire that randomly assigned them to 4 of the eight abstracts. Of the four abstracts, half were randomly provided in text format, and other two were provided as visual abstracts. Participants would read their assigned abstract, and then would be asked to answer the multiple-choice questions. The primary outcome was the percentage of correct responses.
Results: 22 resident physicians have completed the survey. Based on a two-tailed t-test, there was no significant difference between the percent of correct responses for questions that followed the visual abstracts ($M = 76.38\%$, $SD = 30.27\%$) compared to the text abstracts ($M = 69.81\%$, $SD = 28.60\%$); $t(21) = 0.63$, $p = 0.53$).
Conclusion: Visual abstracts did not show an improvement in knowledge retention of clinical trial information compared to text abstracts amongst junior emergency medicine and internal medicine residents. Based on this data, although visual abstracts are a popular trend, they may not serve a beneficial role in knowledge translation of research data. However, additional data points may be needed to detect a significant difference.
Keywords: innovations in emergency medicine education, visual abstracts, knowledge translation

PO031

Mass gathering medicine elective: a clinical and medical education experience in event medicine for residents

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Innovation Concept: Mass gathering events (e.g., music festivals), present challenges to patient care, including resource limitations, loud music, and working with ad hoc teams. Creativity, adaptability, collaboration, leadership, and educational skills are example competencies that exemplify event medicine practice. To offer an opportunity to be immersed in these unique practice contexts and competencies, the first ever mass gathering medicine elective was piloted at the University of Calgary in July 2022. Residents can practice in a unique, low-resource setting and perform as a medical educator, simultaneously.
Methods: 4 second-year family medicine residents participated. Possible events included a community celebration, a parade, an exhibition, and music festivals. Residents provided feedback via a post-elective survey.
Curriculum, Tool or Material: The elective was 1, 2, or 4 weeks long. Clinical requirements were 3.5 shifts/week. Educational requirements were the facilitation of at least 1 in-situ resuscitation simulation. Residents completing 2- or 4-week electives also produced 1 or 2 podcasts, respectively, related to Mass Gathering Medicine.
Conclusion: The average overall elective rating was 6/7. The amount of work was rated 4/7 on average (1 = "extremely light"; 7 = "extremely heavy"). Average self-efficacy ratings, pre- versus post-elective, increased for all learning objectives, all with large effect sizes (Hedges' $g > 0.8$). All objectives ("communication/collaboration", "verbal de-escalation", "triage", "medical response planning", "improvisation/creative-thinking", "simulation facilitation", and "podcast creation"), except one ("radio communication"), achieved statistically significant increases (paired t-test, $p < 0.05$). The elective was well-received by residents and increased their self-efficacy in areas that expand the repertoire of knowledge, skills, and attitudes that may not be as emphasized in other rotations. A mass gathering medicine elective may help residents achieve skills in creativity, leadership, and education, while immersing residents in contexts that are low-resourced, depend on multidisciplinary collaboration, and feature unique clinical presentations. The limitations are that electives must be placed during high-event season (i.e., summer months). There is also unpredictability regarding patient interaction time at events; however, downtime can be filled with educational leadership exercises such as facilitating simulations, peer-teaching skills, and discussion of emergency response plans.
Keywords: innovations in emergency medicine education, mass gathering medicine, resident elective

PO032

Piloting a structured debrief method (SPF debrief model) for in-situ simulations at electronic dance music festivals

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Innovation Concept: Electronic dance music (EDM) festivals are loud and low resource environments that challenge multidisciplinary medical teams to manage unique resuscitation cases (e.g., serotonin toxicity). Consequently, it is important to simulate and debrief emergency situations in-situ, prior to event start. Post-simulation debriefs should be organized, thorough, and psychologically safe, to capture feedback from everyone's perspective so that the medical team's processes and medical tent's environment can be adjusted prior to patients arriving.
Methods: A debrief model for in-situ simulation use at 2 EDM festivals was developed by the Event Medical Director covering these events. This model, "SPF" (Self-Peer-Facilitator), was created by combining and adapting elements of the PEARLS Framework with the debrief approach contained within Lifesaving Society's leadership courses. After debriefing the simulation, participants provided feedback via a survey.
Curriculum, Tool or Material: The 5 SPF debrief model steps include: setting the agenda, case summary, debrief (self-reflection, peer feedback, and then facilitator feedback), medical discussion, and take-homes. During the debrief, each individual shares "feelings, strengths, and suggestions".
Conclusion: 9 participants provided feedback. Agreements to statements were rated (1 = strongly disagree, 5 = strongly agree). The following was rated 5/5 on average: "opportunity to share everything on my mind", "strong understanding of team's strengths", "strong understanding of team's challenges/limitations", "psychologically safe", "organized". "Obtained quality insights/lessons" was rated 4.89/5 on average. The debrief model was well-received by simulation participants at EDM festivals. The model includes speaking time for everyone. It captures feelings first to obtain frames and provides opportunity to address potential emotions early. The model is participant-focused; discussions end with the facilitator. As each person shares, the facilitator can further provide commentary and link/chain ideas/thoughts. The SPF debrief model can be applied to other simulation sessions. One key advantage is that everyone has an opportunity to share in a thorough manner. Limitations include some people sharing cognitive "thoughts" instead, when being asked for affective "feelings", and the risk of some participants using up more time in comparison to others when it is their turn to speak. Total debrief time may be shorter or longer, depending on speaking time allocated to each person.
Keywords: innovations in emergency medicine education, simulation, debriefing

PO033

Co-creating a communication framework with emergency department staff and leaders

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Introduction: The emergency department (ED) is a complex, unpredictable environment where the delivery and reception of information between staff and leaders is key in providing high-quality care and staff engagement. Communication needs intensify in high uncertainty periods, like during COVID-19 pandemic, resulting in an ED's policies and procedures rapidly changing thereby exacerbating communication overload. Study's objectives were threefold: define the current state of communication in ED; understand how and when staff prefer to receive information; and codesign creative solutions to aid in the delivery and exchange of information.
Methods: This single centre study had two phases: (1) An online survey was deployed to understand the experiences and communication preferences of ED staff. Descriptive and inferential statistics were used. (2) A co-design workshop was held with ED staff and leaders for brainstorming ideas addressing issues raised in the survey. Drawing on results of both phases, a communication framework was developed.

Results: ED staff from a range of professions and tenure participated in the survey (n = 38) and co-design (n = 8) workshop. The survey identified a broad range of opinion exists on whether communication needs are being met and satisfaction with communication, with both responses having a moderately positively correlation (Spearman's Correlation 0.576, $p < 0.001$). Email and text messaging were easiest to access communication channels. Staff prefer communication right away for mass casualty, safety threat to department or urgent staffing need. The workshop generated ideas to improve communication which included: structured email, text messaging, department news reel, website for news and interactive discussion, daily huddles, and department meetings. When sorted by the codesign group, most ideas clustered as moderate for both impact and feasibility. The outcome was a communication framework that clearly outlines how, what and when to communicate within ED.
Conclusion: Meeting ED staff's communication needs is essential to staff and patients' wellbeing and associated with a positive impact on job satisfaction. The study's methodology uniquely engages frontline staff and leaders, which other departments can replicate to develop their own communication framework thereby safeguarding against communication overload. This initiative reinforces the value of a collectivistic leadership approach and adds to the body of knowledge around it.
Keywords: communication, leadership, co-design

PO034

Canadian emergency physician experiences and perceptions of personal protective equipment use during the COVID-19 pandemic, based on physician gender

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Introduction: During the COVID-19 pandemic, the use of personal protective equipment (PPE) became routine practice in the emergency department. PPE reduces the transmission of COVID-19 to healthcare staff and to other patients, but supplies were limited at the pandemic outset, and working in PPE can be challenging. The objective of this study was to describe emergency physician experiences and perceptions of working in PPE and to compare perceptions by physician gender.
Methods: Emergency physicians participating in a longitudinal Canadian emergency physician wellness study were invited up to four times (Nov 2020 to Feb 2021) to complete a survey on their experiences during the pandemic. The survey was also advertised on Twitter. Physicians answered free text questions including the question 'How do you feel now about working in personal protective equipment?'. Three investigators (DS, AT, KdW) performed a thematic analysis to group similar codes into themes. We compared the frequency of subtheme codes by physician gender.
Results: In total, 400 emergency physicians participated in the survey, 395 reported gender identity and answered this question on PPE. 204 (52%) identified as men, 190 (48%) identified as women, and 1 identified as nonbinary, with a mean participant age of 43 years. The most reported negative perceptions were that PPE is uncomfortable (mentioned by 30%), slows down the work pace (24%), impairs communication (19%), is stressful/tiring (16%), degrades the physician-patient relationship (12%), reduces work enjoyment (9%), hinders procedures and exams (8%), and PPE supplies were limited (4%). The most reported positive perceptions were that PPE made participants feel safe and protected (41%), physicians accepted it as part of their job (11%), and that there is an adequate PPE supply (11%). Women were significantly more likely than men to mention discomfort ($p = 0.015$), impaired communication ($p < 0.001$), reduced work enjoyment ($p < 0.001$), that PPE hinders procedures and exams ($p = 0.004$), and limited PPE supply ($p = 0.047$).
Conclusion: Emergency physicians found PPE to be uncomfortable, hinder workflow, and impair communication, although it also made them feel safe and protected. Compared to men, women more frequently reported discomfort and challenges with PPE. Moving forward, it may be worth exploring whether the designs of PPE could be improved to reduce these challenges, including considering the differential needs of providers across various genders.
Keywords: personal protective equipment, gender, pandemic

PO035

Describing Ontario's emergency department closures in 2022

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Introduction: Emergency departments (ED) across Canada, primarily rural, have experienced an unprecedented number of closures since the onset of the COVID-19 pandemic. Both physician and nursing shortages are the primary cause for these closures. These closures have created a significant problem for rural populations that already have poor access to primary care and often have a higher burden of chronic disease. Our aim was to describe the ED closures that occurred in 2022 in Ontario in terms of number, location, length, cause and the potential impact to accessing emergency care.
Methods: ED closure data was collected for the year of 2022. Social media, mainstream media and hospital website announcements were scanned daily and the data was input into a database. Hospital, date and time of closure and cause were collected. Other variables such as distance to the next closest ED was collected and summarized for the data. We then summarized the data geographically (i.e., northern vs. southern Ontario) and calculated descriptive statistics.
Results: We found a total of 847 reported ED closures in Ontario that occurred in 23 EDs, the majority of which were rural and in southern Ontario. One non-rural ED closed in southern Ontario for a total of 1 day and 2 rural EDs in northern Ontario closed for a total of 1.4 days. In southern Ontario, the EDs closed for a total of 566.9 days with a mean and standard deviation of 25.8 and 57 days, respectively. More than 90% of the closure days were accounted for by 6 EDs. In southern Ontario, when an ED was closed, the mean driving distance to the next closest ED was 22.3 km, while the mean driving distance for northern EDs that experienced closure was 149.7 km. In 41.7% of the media reports, a nursing shortage was specified as the reason for closure. While only 2 closures were attributed to a physician shortage and the remainder were specified as a general staffing shortage.
Conclusion: Recent ED closures have primarily affected rural southern Ontario communities with some EDs experiencing many days of closure. For northern Ontario communities experiencing ED closure, patients have a higher travel burden when attempting to access emergency care due to the lower population density and greater distance between EDs. Every effort must be made to reduce the impact of rural ED closures on rural populations and ensure consistent access to emergency care.
Keywords: rural, emergency department, closure

PO036

Déploiement des étudiants dans les urgences rurales : un projet en Design Thinking

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Innovation Concept: Depuis 10 ans, la Chaire de recherche et d'innovation en médecine d'urgence de l'Université Laval documente l'accès limité aux soins et services dans les urgences rurales du Canada. Les difficultés de recrutement et de rétention du personnel étaient déjà un problème majeur avant la pandémie, menaçant même la fermeture des urgences rurales. Cette situation s'aggrave depuis la Covid-19 et des rapports récents estiment qu'il manquera 70,000 professionnels de la santé en 2024 au Québec. L'implication d'étudiants en science de la santé serait une solution créative à ce problème.
Methods: Il s'agit d'un projet de leadership en santé. En utilisant les cinq étapes itératives du Design Thinking (empathie, définition, idéation, prototypage et test), les stagiaires du Living Lab Charlevoix essaient de répondre à la question: comment contribuer aux solutions à pénurie de personnel? Le Living Lab Charlevoix vise à développer des innovations en santé rurale et propose un stage à des étudiants en santé, médecins résidents et décideurs. Il repose sur cinq grands piliers : la créativité, le leadership, la médecine rurale, le bien-être et la gestion de pandémie. Au sommet de la pandémie, les stagiaires publient une idée créative dans LaPresse *(Est-il temps de faire appel aux étudiants 19 janvier 2022)*. Pourquoi pas créer un *stage de soutien* au personnel afin d'éviter la fermeture des urgences rurales? À l'été 2022, une seconde cohorte d'étudiants en médecine suivent des infirmières aux urgences plusieurs jours pour mieux comprendre leur perspective et voir s'il serait réaliste de créer ce stage et si oui, *comment être utile exactement?* Plusieurs contributions consensuelles (infirmières et étudiants) sont énoncées et sont triées selon les critères suivants : faisabilité, désirabilité et viabilité.
Curriculum, Tool or Material: Les étudiants et les infirmières jugent qu'un stage de soutien au personnel serait désirable afin de soutenir le personnel en contexte de pandémie et s'entendent sur plusieurs contributions. La prochaine étape est d'établir un prototype de stage comprenant les éléments suivants : 1- bien-être du patient 2- et l'aide à la logistique.
Conclusion: Au-delà des gestes techniques et des risques réels ou imaginés associés, tous s'entendent qu'une telle expérience serait au moins bénéfique afin de sensibiliser les étudiants à la collaboration interprofessionnelle dans un esprit empathique et solidaire en contexte de pénurie de personnel grave. Nous prévoyons déployer un prototype à l'été 2023 dans Charlevoix.
Keywords: innovations in emergency medicine education, rural emergency medicine, design thinking

PO037

Exploring the perspectives of non-insured individuals utilizing emergency departments in Toronto

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Introduction: Non-insured individuals have different healthcare needs from the general Canadian population and face unique barriers when accessing emergency department (ED) care. During the COVID pandemic, Ontario introduced temporary healthcare service coverage for non-insured individuals, which changed how healthcare was accessed and revealed previous and ongoing care gaps. This qualitative study aims to better understand the experiences of non-insured patients accessing emergency care in Toronto, Canada, particularly during the COVID-19 pandemic.
Methods: This study uses a critical realist framework to explore structural factors that facilitate or impede access to care for non-insured individuals. One-on-one interviews were conducted with 24 non-insured patients who experienced ED care in Toronto in the past 3 years. Data were analyzed with the use of Braun and Clark's thematic analysis framework and organized into themes through an iterative process until thematic saturation was reached.
Results: Non-insured patients report multiple layers of barriers when accessing ED care. At a systems level, patients describe challenges including lack of knowledge for staff about healthcare coverage for non-insured patients, uncertainty for patients around what health conditions are appropriate for the ED, and discrimination and stigmatization. At a community level, unaffordable transportation, fragmentation of post-discharge care, and high financial costs serve as barriers. At a department level, concerns include a lack of privacy, language barriers, and unclear signage.
Interviewees' suggestions to improve the ED experience include addressing staff shortages and capacity, ensuring the availability of trained interpreters, improving post-ED access to specialty and primary care, and implementing staff training on anti-discrimination practices and healthcare coverage policies for non-insured patients. Most of all, interviewees emphasized that eliminating financial fees for non-insured patients when accessing EDs would be most beneficial to improving ED care.
Conclusion: The COVID-19 pandemic has uncovered key barriers that marginalized populations, including non-insured individuals, face when accessing the ED. In our study, non-insured patients shared some of the barriers that they encountered and offered suggestions for improvement. Though the COVID pandemic has been a harrowing experience, we have an opportunity and responsibility to take these invaluable patient insights to build a more equitable ED system.
Keywords: non-insured patients, qualitative research, emergency department

PO038

Development of a machine learning model to assign diagnostic and billing codes to visits at an academic emergency department: a pilot study

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Introduction: Artificial intelligence is emerging as a potential tool for reducing the human input associated with certain administrative activities like billing. However, there is a gap in our understanding of whether these approaches can be applied in emergency medicine. The objectives of this pilot were to assess the feasibility and accuracy of machine learning models for the prediction of diagnostic and billing codes for a subset of emergency department visits.
Methods: We conducted a retrospective algorithm development and validation study. All adult patients presenting to the emergency department of an academic health sciences centre with abdominal pain between January 1 to January 31, 2016 and assessed by a physician were eligible for inclusion. Structured data for the selected visits were automatically retrieved. Notes (history, physical examination, and assessment and plan) were manually abstracted from the chart.

We deidentified and anonymized data and divided them into training (80%) and test (20%) sets. We developed and tested two deep learning models. We compared model predictions to the codes submitted for reimbursement and calculated accuracy, recall, precision, F1 score and AUC using bootstrapping.
Results: 200 out of 545 visits meeting inclusion criteria were randomly selected. Collectively, there were 36 unique diagnosis codes and 26 unique billing codes. The top three diagnosis codes included 787 abdominal – pain, masses (n = 136), 009 enteritis – gastro (n = 17), and 799 symptoms, signs and ill-defined conditions – nonspecific abnormal findings (n = 16). The top billing codes corresponded with a multiple systems assessment. Accuracy was 68.7% for the diagnosis code model and 78.9% for the billing code model. Recall was 68.1% and 82.4% for the diagnosis and billing code models, respectively. Precision was 10.1% and 26.6% for the diagnosis and billing code models, respectively. F1 score was 17.1% and 40.2% for the diagnosis and billing code models, respectively. AUC was 0.74 and 0.84 for the diagnosis and billing code models, respectively.
Conclusion: We derived two deep learning models to predict diagnostic and billing codes from electronic notes recorded for ED visits for abdominal pain. Both models performed moderately well with the billing code algorithm performing better. Future model development will focus on training and testing models with a larger dataset, including other clinical presentations and more varied assessment and procedural codes.
Keywords: machine learning, billing, emergency medicine

PO039

Off-road vehicle trauma in urban and rural New Brunswick: mechanisms and risk factors

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Introduction: Off-road vehicle (ORV) use among adults and children has increased across urban and rural areas in Canada. As a result, ORV related injuries have increased as well. Our objective was to describe the epidemiology of ORV major trauma in New Brunswick by evaluating the demographics, trends, mechanisms of injuries, types of injuries, and associated risk-factors.
Methods: This study was a retrospective review of all patients with ORV trauma (all-terrain and utility terrain vehicles and snowmobiles) from the New Brunswick Trauma Registry from 2014-2021. The registry collects data from all patients who present to a level-1,-2 and -3 trauma centre in the province with injury severity score (ISS) > 12. Data was analysed descriptively with 95 % confidence intervals where appropriate and the study followed the STROBE reporting guidelines.
Results: There were 681 patients with ORV major trauma in New Brunswick in the 7-year period. The mean age was 39 years old with 11.3% patients under 19 years old; 78.3% of patients were male. All-terrain and utility terrain vehicles were used in 67% of traumas and snowmobiles in 33%, respectively; 83.1% victims were drivers. Of 325 patients with documented blood alcohol levels, 60% were greater than 0.05%. Victims used a helmet 57.3% of the time and 16.2% did not; helmet-use was not documented in 26.5 % cases. The mean prehospital and arrival GCS were both 14 (95% CI; 13–14). Seasonally, most traumas occurred in January (11 %), February (12.9 %) and March (10.6%). The majority of major ORV traumas were admitted to a medical ward (57.1%), followed by admission to an intensive care unit (18.9%) and transfer to the operating room/interventional room (13.5%). The mean ISS score was 13.5 (12.5–14.7). Overall, 665 (97.7%) patients were discharged and 16 (2.3%) died.
Conclusion: This is the first description of ORV major trauma patients in New Brunswick. Alcohol use, male gender and winter were commonly identified with ORV trauma. The findings of this study may increase public awareness of the health risks associated with ORV use and assist in prevention strategies to mitigate the morbidity and mortality associated with ORV use.
Keywords: trauma, prehospital medicine, off-road vehicle crash

PO040

Ultrasound made ultra-simple: an innovative approach to asynchronous ultrasound learning

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Innovation Concept: Point of care ultrasound (PoCUS) teaching is an increasingly important part of medical training[1–3]. Research suggests that "hands on" time using ultrasound improves sonographic abilities[1–5]. The Dalhousie Medicine New Brunswick PoCUS club has established Canada's first ultrasound lending library. Our program promotes flexible learning by providing undergraduate medical learners access to online teaching in conjunction with a lending library where they can borrow a handheld ultrasound machine for personal use.
Methods: The DMNB PoCUS club was started by a group of medical students due to decreased availability of in-person ultrasound training sessions during COVID-19. With ultrasound becoming a larger part of both medical school and postgraduate training programs alike, the club placed an emphasis on early access and skill development for novice users
Curriculum, Tool or Material: The initial step was to develop multimedia programming under the guidance of our faculty lead. The 11 videos showcase basic ultrasound scans, with a priority on sonoanatomy and image acquisition. The videos are hosted on YouTube and made accessible via QR codes displayed on posters throughout the medical school. Using this content as proof of concept, a 25,000$ grant was obtained from the Saint John Regional Hospital Foundation and six ultrasound probes (Butterfly IQ) were purchased. This style of probe functions with the user's tablet or cellphone as the display and therefore is extremely portable. The probes are available exclusively to UGME students, who are able to borrow a probe via our library website and practice at home, or bring the probe to their clinical electives. We have developed robust guidelines to ensure appropriate usage and probe care. Students are strongly encouraged to use the probes in conjunction with our educational videos to ensure a meaningful educational experience.
Conclusion: This style of educational content could be a cost-effective way to increase asynchronous learning opportunities with PoCUS.[2,6] Our ultrasound probe library has had strong uptake at our school and we feel it could be easily adapted for use at other medical schools, with an existing ultrasound curricula, if portable probes are made available to students.
Keywords: innovations in emergency medicine education, PoCUS, undergraduate medical education

PO041

Sedation and analgesia for reduction of paediatric ileocolic intussusception: a multinational cross-sectional study (PAINT)

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Introduction: Ileocolic intussusception is an important cause of intestinal obstruction in children. Timely reduction is necessary and believed to be distressing but usually performed without sedation given controversies surrounding increased risks of intestinal perforation and failed reduction. Our objectives were to characterize the prevalence of opioid analgesia and sedation for reduction and their association with intestinal perforation and failed reduction.
Methods: This medical record review included 3203 children 4–48 months with attempted reduction of ileocolic intussusception from January 2017 to December 2019 (86 institutions; 14 countries). The primary outcomes were intestinal perforation and failed reduction.
Results: We included 3203 patients [2054/3203 (64·1%) males]. Opioid analgesia, sedation, and opioids plus sedation were documented in 395/3134 (12·6%), 334/3161 (10·6%), and 178/3134 (5·7%), respectively. Perforation was uncommon (13/3203;0·4%). In the unadjusted analysis, any analgesia plus sedation [OR:4·06; 95% CI:1·11,14·88; $p = 0·03$], opioids plus sedation [OR:5·05; 95% CI:1·38,18·52; $p = 0·02$], and number of reduction attempts [OR:1·48; 95% CI:1·03,2·11; $p = 0·03$] were significantly associated with perforation, but not sedation alone. In the adjusted analysis, neither of these covariates remained significant. Failed reduction occurred in 484/3184 (15·2%) attempts. In the unadjusted analysis, age, any analgesia, opioids, any analgesia plus sedation, opioid analgesia plus sedation, time to reduction, type of reduction, and gastrointestinal anomaly were significantly associated with failed reduction, but not sedation alone. In the adjusted analysis, older age [OR:1·05 (per month); 95% CI:1·03,1·06; $p < 0·001$], opioids [OR:1·60; 95% CI:1·07,2·39; $p = 0·02$], opioids plus sedation [OR:2·36; 95% CI:1·40,3·97; $p = 0.001$], longer time to reduction [OR:1.00 (per hour); 95% CI:1·00,1·00; $p = 0·002$], hydrostatic enema [OR:1·12; 95% CI:0·78,1·63; $p = 0·54$], and pre-existing gastrointestinal anomaly [OR:3·97; 95% CI:1·35,11·63; $p = 0·01$] remained significant.
Conclusion: In this international study, more than two thirds of patients received neither opioids nor sedation for reduction ofi ntussusception and neither were associated with intestinal perforation. However, opioids with or without sedation were associated with failed reduction. Our findings suggest avoiding opioids for reduction of intussusception in children but challenge the widespread practice of withholding sedation.
Keywords: intussusception, sedation, analgesia

PO042

Crowding in global emergency departments: an overview of the interventions and solutions

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Introduction: Emergency Department (ED) overcrowding presents a global public health crisis and results from the inability of healthcare systems to provide adequate service, leaving the ED to serve as the safety valve for dysfunction or insufficient resources. ED crowding is defined as a situation where demand for emergency services exceeds the ability of an ED to provide care within an appropriate time frame. A focus of current research has been related to investigating the interventions that are successful, however the current state of the literature assessing input, throughput, and output solutions has not yet been investigated.
Methods: The review is guided by the current PRIOR and PRISMA statements, and involved Pubmed, Medline, and Embase searches for eligible systematic reviews. A risk of bias and quality assessment were performed for each review, and the results were synthesized into a narrative overview which followed the results of a previously published overview which addressed the causes, measures, and harms of crowding in Emergency Departments.
Results: The results of the overview of systematic reviews were broken down into input, throughput, and output solutions. Within input, proven solutions that displayed success are related to healthcare system-related solutions. These include increased access to primary and long-term care, thereby decreasing non-urgent presentations. Throughput solutions, while linked to staff and flow through the emergency department, are often influenced by both input and output factors. Finally, the most effective solutions were related to output interventions, which involved decreasing inpatient boarding in the emergency department and promoted effective functioning of both input and throughput interventions.
Conclusion: A number of common themes have emerged from the current set of literature on crowding interventions. The foremost of these was that output and healthcare-based solutions are the most effective at reducing crowding in Emergency Departments. However, a second common theme among the systematic reviews was that many of the interventions did not match the problems that were identified for specific areas. Thus, it is important to tailor resources and solutions to the regional concerns faced in each area. Moving forward based on these results, it is important to focus efforts on tailoring interventions to the specific problems that are encountered by regional centers.
Keywords: emergency department crowding, interventions, solutions

PO043

Quantity of opioids to prescribe for acute pain to limit unused medication (OPUM study)

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Introduction: Misuse of unused prescription opioids contributes to the opioid epidemic and opioid-related deaths. To help limit unused opioids, our objectives were to determine the quantity of opioids consumed by emergency department (ED) discharged patients treated for acute pain and the percentage of unused opioids available for misuse.
Methods: Multicenter prospective cohort study. Six tertiary care teaching hospitals and one community ED. We included patients $\geq$ 18 y.o. who visited the ED for acute pain ($\leq$ 2 weeks) conditions (neck pain, low back pain, fracture, other musculoskeletal, renal colic, abdominal pain, and others) and were discharged with an opioid prescription. Patients completed a 14-day diary of daily pain medication use and answered standardized questions by telephone about their pain management. Our primary outcome was the quantity of 5mg morphine tablets (or equivalent) consumed during a 14-day period post ED visit. Secondary outcomes were prescribed, and unused tablets during the same period. We also calculated the quantity of opioids allowing an adequate supply to 80% of patients for 2 weeks and 80% of patients during the first 3 days. This 80% threshold is a reasonable balance between sufficient pain treatments for a large majority of patients while limiting the quantity of unused opioids.
Results: A total of 2112 patients were included (mean age ±SD: 51±15 y.o., 48% female). Patients consumed a median of 5 morphine 5mg tablets (IQR:12) which represented 31% of total quantity

prescribed. For the entire cohort, the quantity of opioids needed for 80% of patients for 2 weeks was 16 morphine 5mg tablets (or equivalent), 21 for fractures, 20 for low back pain, 16 for other musculoskeletal pain, 15 for neck pain, 11 for other pain conditions, 8 for renal colic, and 7 for abdominal pain ($P < 0.001$). The quantity to adequately supply 80% for the whole cohort for the first 3 days was 7 morphine 5mg tablets.

Conclusion: Patients discharged from the ED with acute pain conditions consumed a median of 5 morphine 5mg tablets (or equivalent) and more than two thirds of the quantity prescribed are unused. Emergency physicians should consider prescribing a smaller quantity of opioids adapted to the painful condition and have the pharmacist dispense them in even smaller portions to minimize unused opioids at home.

Keywords: opioids, acute pain

PO044

Evidence that emergency department care is more costly than other outpatient settings for low-acuity conditions is limited: a systematic review

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Introduction: Purpose: Caring for patients with low-acuity conditions in Emergency Departments (ED) is often thought to cost more than treating those patients in other ambulatory settings. Understanding the relative cost of care between settings has critical implications for healthcare policy and system design. What is the relative cost of care for low-acuity ambulatory conditions treated in the emergency department versus other ambulatory care settings?

Methods: We conducted a systematic review of papers comparing the cost of care for low-acuity and ambulatory-care sensitive conditions in ED and other outpatient settings. We searched PubMed, EMBASE, CINAHL, and Web of Science for peer reviewed papers, plus Google for grey literature. We conducted duplicate screening and data extraction, and quality assessment of included studies using an adapted SIGN checklist for economic studies. We calculated an unweighted mean charge ratio across studies and summarized our findings in narrative and tabular format.

Results: Results: We identified 1 study comparing costs. 18 studies assessed physician or facility charges, conducted in the United States, United Kingdom, and Canada, including cohort analyses (5), charge analyses (5), survey (1), and database searches (5) assessing populations ranging from 370 participants to 60 million. Charge ratios ranged from 0.60 to 13.45 with an unweighted mean of 4.20. Most (12) studies were of acceptable quality.

Conclusion: Conclusion: One study since 2000 assessed the comparative costs of ED versus non-ED care for low-acuity ambulatory conditions. Physician and facility charges for ED care are higher than in other ambulatory settings for low-acuity conditions. Empirical evidence is lacking to support that ED care is more costly than similar care in other ambulatory settings. Clinicians and policymakers should be aware of the paucity of evidence to support the general claim that it is more costly or inefficient to treat patients with low-acuity ambulatory conditions in the ED versus other settings.

Keywords: cost of care, ambulatory care sensitive conditions, emergency medicine

PO045

The epidemiology of major trauma patients in Nova Scotia with burn injuries

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Introduction: The epidemiology of burn trauma in Nova Scotia is poorly understood. Our primary objective was to describe the epidemiology and injury trends among patients with burn-related major trauma in Nova Scotia. As a secondary objective, we sought to determine predictors of mortality in this population.

Methods: We conducted a retrospective observational cohort study of all major trauma patients with burn injuries between April 1, 2001, and March 31, 2019 using data from the Nova Scotia Trauma Registry. Characteristics and outcomes for patient subgroups were compared using t-tests, chi-square analysis and Fisher's exact tests. Trend analysis for mortality and other outcomes was performed using linear regression. A multivariate regression model was created to assess for predictors of mortality.

Results: A total of 436 patients were included in the analysis. The incidence of burn injuries was 2.55 per 100,000 person years. Overall, 65.6% of patients died with nearly half of all deaths occurring at the scene. The highest incidence and mortality rates were seen in elderly patients aged 75 and above. We observed a decreasing trend in mortality over the study period ($p = 0.042$). Patients predominantly had isolated burns (87.2%), major burns (69.7%), and associated inhalation injury (60.3%). The mean total body surface area (TBSA) of burn was 53.2±35.4%. Survivors tended to be younger (35.9±20.6yrs vs 50.8±23.3yrs, $p < 0.001$), male (79.3% vs 65.4%, $p = 0.002$), had lower mean %TBSA involved (29.5±19.9% vs 67.9±34.9%, $p < 0.001$) and had combined trauma (18.7% vs 9.8%, $p = 0.008$). A greater proportion of non-survivors sustained inhalational injuries (75.2% vs 32.0%, $p < 0.001$). Patients with isolated burns had higher rates of overall mortality (67.9% vs 50%, $p = 0.008$) and in-hospital mortality (39.0% vs 3.4%, $p < 0.001$) compared to those with combined burns and traumatic injury. Mortality was associated with major burns (OR 8.82, 95% CI 2.43–31.95), inhalation injury (OR 3.28, 95% CI 1.39–7.73), initial carboxyhemoglobin (OR 1.09, 95% CI 1.05–1.13) and increasing age (OR 1.05, 95% CI 1.02–1.07). Intubation at the scene or in the ED was associated with survival (OR 0.17, 95% CI 0.07–0.41).

Conclusion: In this population-based study of burn injuries, mortality was associated with older age, major burns, inhalational burns, and initial carboxyhemoglobin level. These results provide a foundation of evidence to guide future research, resource planning, and injury prevention efforts.

Keywords: burn, trauma, epidemiology

PO046

Evaluating the utility of a remote acuity prediction tool in a Canadian academic emergency department

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Background and Aim Statement: There is increasing interest in harnessing artificial intelligence to virtually triage patients seeking care. The objective of this study was to examine the utility of a virtual machine learning algorithm to predict acuity scores in emergency department (ED) patients.

Measures and Design: This was a retrospective medical record review of adult patients conducted at an academic tertiary care ED (annual census 65,000) from January 2021 to August 2022. Data including ED visit date and time, patient age, sex, stated reason for visit, CEDIS complaint and patient reported pain score were used by the machine learning algorithm to predict acuity scores. The algorithm was designed to up-triage high risk complaints to promote

safety for remote patient use. The predicted scores were then compared to nurse-led triage scores previously derived in real-time using eCTAS, an electronic triage decision-support tool used in the ED. Interrater agreement was estimated using kappa statistics with 95% confidence intervals (CIs).
Evaluation/results: 21,469 unique ED patient encounters were included. Exact modal agreement was achieved for 10,396 (48.4%) patient encounters. Interrater agreement ranged from poor to fair, estimated using unweighted kappa (0.18; 95% CI: 0.17–0.19), linear-weighted kappa (0.25; 95% CI: 0.24–0.26), and quadratic weighted kappa (0.36; 95% CI: 0.35–0.37) statistics. Using the nurse-led eCTAS score as the reference, the machine learning algorithm over-triaged 9897 (46.1%) and under-triaged 1176 (5.5%) cases. The top five CEDIS complaints that were under-triaged were conditions generally requiring further probing to delineate their nature, including abnormal lab/imaging results, visual disturbance, fever, imaging/blood test, and other skin conditions. The top correctly triaged complaints were chest pain with cardiac features, abdominal pain, back pain, headache, and lower extremity pain.
Discussion/impact: This machine learning algorithm needs further refinement before safely implementing for patient use.
Keywords: QIPS, healthcare innovation and technology, machine learning

PO047

Can our patients get follow-up? Evaluating emergency department patients' access to primary care follow-up after emergency department discharge.

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Introduction: The accessibility of Primary Care Providers (PCP) is essential for patients who require follow-up after discharge from an Emergency Department (ED). Follow-up within 7 days of ED discharge leads to decreased mortality and subsequent admissions. Our objectives were to evaluate patients' perceived and recommended number of days to a follow-up appointment with their PCP, and to ascertain whether patients were able to obtain timely follow-up after a visit to the ED. Our primary outcome was to determine the proportion of patients who received attainable discharge follow-up instructions and subsequently achieved successful follow-up.
Methods: This was a multicenter prospective cohort study using convenience survey sampling of patients at all three hospitals in Saskatoon, SK. A chart review was conducted, and patients were subsequently contacted to report whether they achieved successful PCP follow-up after their ED visit. Data was analyzed using descriptive and inferential statistics.
Results: 304 patients were surveyed. 27 of these patients did not have access to any PCP follow-up whatsoever. Of the remaining patients, 61% believed they could follow-up within 7 days of ED discharge. 83 patients were recommended to follow-up with a PCP by an ED physician but only 40% of these patients received a specific timeline for follow-up. 57% of the patients were told to follow up within 7 days. 45% of the patients were recommended to follow up sooner than their perceived ability to do so. 53% of the patients contacted were able to follow-up within the recommended time frame, while 47% were not.
Conclusion: This study showed that patients discharged from EDs in Saskatoon seem to have quicker access to PCP follow-up compared to past Canadian data, with most follow-up appointments being available within 7 days. Unfortunately, some patients still do not have access to a PCP for follow-up, which reflects issues in primary care. Many discharge instructions did not include a specific timeline in which a patient should follow-up. Of those that did, less than half of the recommended follow-up time frames were not attainable by the patients. ED physicians might want to consider adopting a practice of specifically inquiring about patient access to PCP follow-up upon discharge and advising specific time frames for doing so based on patient responses. This would improve both the clarity and efficacy of discharge instructions. In Saskatoon, recommending PCP follow-up within 7 days seems reasonable for most patients.
Keywords: primary care provider, emergency department, follow-up

PO048

Evaluation of virtual care outcomes: a retrospective QUality and safety analysis (EVOQUe)

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Introduction: In March 2020, after the declaration of the SARS-CoV-2 pandemic in the province of Ontario, virtual care saw a dramatic increase in utilization. A month later, over 70% of visits in the province were being conducted virtually. Despite the adoption of virtual care and its ongoing use, there is an absence of patient outcome data and research to support the development of health policy.
Methods: We conducted a retrospective observational study using ICES, an administrative health database in the province of Ontario. We compared 7 and 30-day patient outcomes between intra-pandemic virtual care visits and intra-pandemic in-person care visits. The intra-pandemic timeframe was defined as March 14, 2020, to March 13, 2022. A washout period of 7 days was included for each visit which ensured downstream outcomes for most categories were not included as subsequent index visits. Matches were performed on a visit-to-visit basis and were hard-matched on 10 separate criteria. A 1:1 match was conducted between populations and standardized differences of 0.10 were used to determine significance.
Results: A total of 11,999,501 intra-pandemic virtual care visits were matched to intra-pandemic in-person care visits (total 23,999,002). No significant differences were seen in revisit rates to the same specialist, primary care (in-person or virtual), hospital or ICU admission, OR use, ED visits, or mortality within 7 days. At 30-days, in-person visits during the pandemic had a higher rate of in-person revisits to primary care (23.74% vs 15.92, SD 0.20) while initial virtual care visits had increased rates of virtual revisits to primary care (29.62% vs 24.08%, SD 0.13). No other significant differences were seen at 30 days. Specialty-specific analyses demonstrate that patients seen in person by their PCPs were more likely to subsequently be seen in person at 7 days (10.08% vs 6.96%, SD 0.11) and at 30-days (27.74% vs 17.44%, SD 0.25). Patients initially seen virtually in primary care had a higher 30-day rate of virtual revisit (27.76% vs. 22.20%, SD 0.13) while 7-day rates were unchanged. No other differences in primary care outcomes were noted.
Conclusion: This analysis demonstrates that 7 and 30-day outcomes between virtual and in-person care within the pandemic have no significant differences at an aggregate level. Specialty-specific outcomes may be further explored to help inform specific patient care pathways. Resource utilization and access to care were explored in separate analyses.
Keywords: virtual care, safety and patient outcomes

PO049

Healthcare utilization and outcomes of patients seen by virtual urgent care compared to traditional in-person emergency department care

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Introduction: As part of the COVID-19 pandemic response, the Ontario Ministry of Health funded a pilot program of 14 virtual urgent care (VUC) initiatives across the province. The objective of this study was to compare 30-day healthcare utilization and outcomes of patients using VUC services to similar patients who had a traditional in-person emergency department (ED) visit.
Methods: We used patient-level encounter data from each VUC visit linked to provincial administrative databases to identify subsequent 30-day healthcare utilization and outcomes. As differences between individuals using VUC or in-person ED care were expected, two subgroups of VUC users were defined: (1) those promptly referred to an ED by a VUC provider; and (2) those discharged home by a VUC provider following their VUC visit. Patients of the VUC cohort were then matched to an equal number of patients presenting to an ED in-person on the basis of encounter date ($\pm$ 14 days), CEDIS complaint and the logit of a propensity score computed from each patient's age, sex, neighbourhood income quintile, urban/rural residence status, Ontario Marginalization Index quintiles, whether patients were rostered with a family physician, comorbidities, and the number of physician visits, ED visits and hospitalizations in the preceding year.
Results: We matched 2140 patients referred to the ED by a VUC provider to a similar cohort of patients who presented in-person to the ED. Although patients presenting to the ED in-person were more likely to arrive by ambulance and have a higher acuity score, index visit admissions (10.5 vs. 9.4%), 30-day ED visits (16.9 vs. 18.1%), and hospitalizations (12.8 vs. 11.2%) were similar between the groups. We matched 14,264 patients who were seen by a VUC provider and discharged home with a similar cohort of patients who presented in-person to the ED and were discharged home. Patients discharged from VUC were more likely to have an in-person ED visit within 72 hours (13.7 vs. 7.5%; Δ 6.2, 95% CI: 5.5 to 6.9%), 7 days (16.5 vs. 10.7%; Δ 5.8, 95% CI: 5.0 to 6.6%) and 30 days (21.9 vs. 18.1%; Δ 3.8, 95% CI: 2.6 to 4.7%), but hospital admissions were similar within 72 hrs (1.1 vs. 1.3%), and higher within 30 days for patients who were discharged home from the ED (2.6 vs. 3.3%).
Conclusion: Although VUC may be an alternative healthcare resource for patients with minor medical concerns, patients discharged from VUC were more likely to have an ED visit within 30 days compared to patients who presented in-person to the ED.
Keywords: virtual care, emergency medicine, healthcare utilization

PO050

First Nations status is related to leaving without completing treatment in Alberta emergency departments: a population-based retrospective cohort study

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Introduction: Previous studies show that more visits to emergency departments (EDs) by First Nations (FN) patients end in "leaving without being seen" or "leaving against medical advice" (LWBS/AMA) in Alberta than non-FN visits. Our objective was to assess the relationship between FN status and LWBS/AMA when controlling for geography, hospital type, patient demographics and ED visit characteristics.
Methods: We conducted a retrospective cohort study for the period April 2012 to March 2017 using data from 111 EDs. We used multivariable logistic regression models to control for covariates of LWBS/AMA including FN status; patient sex, age, comorbidities, area of residence; average income in the patient's residential area; Canadian Triage Acuity Scale; ambulance vs. non-ambulance arrival; night and evening presentation vs. day time presentation; and hospital type (i.e. large metro, small metro, regional, large community, small rural). We examined models for subsets of patients with 5 pre-selected disease categories and 5 specific diagnoses to assess effects of different ED visit reasons on LWBS/AMA among FN and non-FN populations.
Results: Our data contains 11,686,287 ED visits of which 1,099,424 are by FN patients (9.4%). 6.7% of FN visits end with the patient LWBS/AMA vs. 3.6% of non-FN visits. In adjusted models, FN status was associated with greater odds of LWBS/AMA compared to non-FN status (odds ratio 1.93, 95% confidence interval [1.91, 1.96]). FN status was associated with greater odds of LWBS/AMA compared to non-FN status in subset models for all 5 disease categories (infection 1.57 [1.51, 1.62]; mental health 1.74 [1.64, 1.85]; breast, obstetrics and gynecology 1.94 [1.83, 2.06]; substance use 1.25 [1.18, 1.32]; trauma and injury 2.12 [2.06, 2.17]), and 4 of 5 diagnoses (acute upper respiratory infection 2.14 [1.78, 2.58]; anxiety 1.83 [1.65, 2.03]; long bone fractures 3.42 [2.74, 4.28]; spontaneous abortion 2.43 [2.04, 2.90]). FN status was not significantly associated with LWBS/LAMA in opioid related visit model results (1.15 [0.97, 1.36]).
Conclusion: FN status is associated with greater odds of LWBS/AMA and this is not explained by factors such as diagnosis, acuity, geography, or patient demographics other than FN status. As LWBS/AMA may delay needed care or interfere with continuity of care, providers and departments should work with local Nations to develop and adopt strategies to retain FN patients in care.
Keywords: first nations, health services research, equity

PO051

Exploring "Leaving Without Being Seen" from Alberta emergency departments with First Nations partners: a population-based retrospective cohort study

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Introduction: We examined visits classified as "leaving without being seen" (LWBS) in emergency departments and urgent care centres (EDs) in Alberta with First Nations (FN) partner organizations. International studies have previously reported a disproportionate frequency of Indigenous patients LWBS. Our objective was to describe demographic and visit characteristics for patients LWBS stratified by FN status.
Methods: We conducted a retrospective cohort study for the period April 2012 to March 2017 using data from 111 Alberta EDs. We used multivariable logistic regression models to examine covariates of LWBS for FN and non-FN patients. The models were repeated for patients presenting to ED with five pre-selected disease categories (e.g. trauma; mental health) to examine effects of different ED visit reasons among FN and non-FN populations. Proportion of LWBS that return to ED within 72 hours, and the dispositions of these return

visits, were assessed descriptively. Statistical significance was set at $p < 0.05$.

Results: FN made up 9.4% of all ED visits (1,099,424 of 11,686,287). 4.4% of FN visits end with the patient LWBS vs. 2.7% of non-FN visits. FN patients who arrived in the evening vs. day had lower odds of LWBS relative to non-FN (1.11 [1.1, 1.1] vs. 1.5 [1.5, 1.5]). The same was true for arrival at night vs. day (1.1 [1.1, 1.2] vs. 1.3 [1.3, 1.4]). Ambulance vs. non-ambulance arrival was associated with lower odds of LWBS for both groups (odds ratio 0.8 [95% confidence interval 0.8, 0.8] for FN patients vs. 0.7 [0.7, 0.7] for non-FN). FN patients were less likely to LWBS at every triage level. Where triage score was missing, FN patients were more likely to LWBS (6.0 [5.8, 6.2] vs. 3.5 [3.5, 3.6]). FN patients were less likely to LWBS at smaller care sites, but more likely to LWBS at larger sites, especially adult tertiary hospitals (8.5 [8.2, 8.8] vs. 6.3 [6.2, 6.4]). Patient sex, age, income and comorbidities all made statistically significant but small differences (< 0.1 difference in odds ratio) for FN patients vs. non-FN LWBS. Results of disease category models were similar to overall results. After LWBS, 23.4% of FN visits return to the ED within 72 hours (vs. 20.2% for non-FN, $p < 0.001$). A similar proportion of all FN and non-FN return visits led to hospitalization (4.9% vs. 5.2%, $p = 0.14$).

Conclusion: Leaving is a negative care outcome, which can delay needed care. Our results offer insight into times and locations where FN patients are at higher risk of LWBS.

Keywords: first nations, leaving without being seen, equity

PO052

Incidence of suicide and suicide-related emergency department visits in Kingston, ON before and during the COVID-19 pandemic

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Introduction: Mental health issues have increased during the COVID-19 pandemic. However, it is unclear what role it has had on suicide-related behaviour. We sought to describe and compare the incidence rates of suicide and suicide-related presentations (SRPs) to the emergency department (ED) before and during the COVID-19 pandemic in the Kingston, Frontenac, Lennox, and Addington (KFLA) Local Health Integration Network (LHIN) in Ontario, Canada. SRPs included suicide ideation, intent, or attempt.

Methods: This was a retrospective cohort study comprised of data from the Kingston Health Sciences Centre's (KHSC) Emergency Department Information System (EDIS) as well as provincial coroner records. Hospital data on suiciderelated visit count and completed suicide rates from two pre-COVID time periods (Mar 17–May 18, 2018; Dec 26, 2018–Feb 9, 2019) were compared with data from two provincial COVID lock-down periods (Mar 17–May 18, 2020; Dec 26, 2020–Feb 9, 2021). Demographic characteristics including age, sex, and urban/rural status were compared. Inclusion criteria was based on ICD-10 codes for suicidal ideation, intent, and attempt (R45.8, X60-X84, and T14.91, respectively) or confirmed as suicide in the coroner's database. Individuals < 5 years of age were excluded. Descriptive statistics were calculated. Unpaired t-tests were used to statistically compare PRE-COVID and COVID groups, while chi-squared testing was used for distribution data (reason for visit and disposition).

Results: 297 patients made 339 SRP ED visits . The crude suicide incidence per 100,000 people in KFLA was 5.74 (PRE-COVID-1), 4.78 (PRE-COVID-2), 4.31 (COVID-1), and 2.87 (COVID-2). There was no difference in the incidence rate of SRP ED visits in COVID-1 (RR = 0.97; 95% CI = 0.72–1.31), but there was a statistically significant 50% increase in SRP ED visits in COVID-2 (RR = 1.51; 95% CI = 1.10–2.06). There was no difference in the incidence of suicide completion in COVID-1 (RR = 0.75; 95%CI = 0.32-1.78) or COVID-2 (RR = 0.60; 95% CI = 0.22–1.65). Reason for ED visit distribution changed significantly between COVID-1/PRE-COVID-1 ($\chi^2 = 15.45$, df = 3, p = 0.003) and COVID-2/PRE-COVID-2 ($\chi^2 = 13.13$, df = 3, p = 0.009). Disposition location distribution changed significantly between COVID-2 and PRE-COVID-2 ($\chi^2 = 10.00$, df = 3, p = 0.04)but not between COVID-1 and PRE-COVID-1 ($\chi^2 = 5.43$, df = 3, p = 0.06).

Conclusion: These results will contribute to the growing literature on the topic of suicidality during the COVID-19 pandemic and may inform public health interventions.

Keywords: mental health, suicide, emergency department

PO053

Indigenous equity within the emergency department: systematic review and implementation study

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Introduction: Internationally, Indigenous peoples face inequitable health care access and have disproportionately worse health outcomes than their non-Indigenous counterparts. Indigenous peoples may experience poorer health outcomes due to various social, economic, and cultural factors, such as poverty, discrimination, and a geographical barrier to healthcare services. These disparities undermine the health of Indigenous peoples and are further exacerbated in areas of acute care. In emergency departments (EDs), Indigenous patients face additional barriers to care due to language and cultural differences, mistrust in the healthcare system, and a history of mistreatment. Examining interventions attempting to address these barriers is important to gain a better understanding of the landscape and any specific challenges to implementation.

Methods: To identify relevant publications for the review we used search strategies, developed with the assistance of a research librarian, to search several indexed databases including Medline, Embase, Web of Science, Cochrane Central, CINAHL, and Scopus from inception to December 2022. We also conducted a secondary search of the grey literature. To be included in the review, articles described interventions aimed at improving Indigenous health equity in acute care settings. Article quality was evaluated using a two-step blended approach through an examination of study design and a secondary appraisal of Indigenous research methodologies.

Results: Indigenous health equity within EDs is a relatively new area of research. Upon examination of the literature, five studies were eligible for the review. Utilizing thematic analysis, three key interventional themes emerged from the data including: creation of an ethically designed waiting room, offering trauma informed care education to medical staff, and incorporating Indigenous cultural practices into care.

Conclusion: Improving Indigenous health equity in EDs involves addressing systemic barriers and working to create a more inclusive and culturally safe environment for Indigenous patients. To ensure that Indigenous health equity interventions within the ED are culturally appropriate and responsive, it is crucial to involve Indigenous communities and organizations in the planning and implementation process of any proposed intervention. The future of this work will include research direction discussions with local Indigenous communities and the implementation of Indigenous artwork into Alberta EDs.

Keywords: patient-centered care, cultural safety, indigenous health equity

PO054

Effective approaches to simulation debriefing of interprofessional teams

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Introduction: Debriefing after an interprofessional (IP) simulation is a key aspect of participant learning. Incorporating IP co-debriefers mitigates power discrepancies and increases collaboration between debriefers and participants to optimise learning. However, there are challenges that come with co-debriefing an IP team following a simulation, with no clear recommendations on how to manage these challenges. This study aims to identify methods on how IP faculty can effectively debrief a post-licensure IP team following a code-blue simulation.
Methods: This study conducted both a systematised literature review, and a theoretical thematic analysis of post-simulation IP debriefing sessions based on a modified Braun and Clarke's 6-Step Framework. The literature review searched PubMed and CINAHL databases. Search terms for each database were Debrief* AND (Interprofessional or multidisciplinary or interdisciplinary) AND simulation, with a date range of 2012 to 2022. 30 articles were identified by title and abstract review, with 16 articles meeting inclusion criteria. The **thematic analysis was** derived from post-simulation IP debriefing data collected from 12 simulation IP debriefs. This data included debrief-the-debriefer notes and the participants' post-debrief surv
Results: Five broad themes with nine sub themes were established from correlating the literature review findings alongside the post-simulation IP debriefing data and survey data: Effective Communication (use of specific questioning, discussion generation, empowering facilitators, and framework), Knowledge Gaps (specific education, empowering facilitators), Therapeutic Milieu (empowering participants, framing discussion, facilitator confidence/comfort), Effective Physical Structure, and Suggesting Tool Use.
Conclusion: Multiple strategies for IP co-debriefing were found to be useful, such as using an IP learner-centred approach with combined open-ended questions and specific questioning; specific frameworks to guide the debrief; and IP debriefers educated in both simulation cases and debriefing. This study contributes to the research by acknowledging the uniqueness of IP co-debriefing compared to other debriefing models, and identifying effective strategies for IP co-debriefers to use in a post-licensure IP debrief following a simulation. Further research should explore in-depth review of faculty debrief-the-debriefer sessions to inform a guiding framework for future debriefers.
Keywords: inter-professional simulation, debriefing framework

PO055

The role of sex and gender in concussion outcome differences among patients presenting to the emergency department: a systematic review

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Introduction: While sex and gender-based analyses (SGBA) are encouraged by funding agencies and differences may have implications for management, SGBA in the emergency department (ED) for patients with concussions have been limited. Additionally, no systematic review has assessed sex and gender based-differences in adult patients with concussions strictly within the ED. The objective of this systematic review was to identify research involving adults presenting to the ED with a concussion to document the reporting of sex and/or gender, the prevalence of SGBA, and to summarize sex and/or gender-based differences in ED presentation, management, and outcomes.
Methods: Electronic databases and grey literature were searched to identify studies that recruited adult patients with concussion from the ED. Two independent reviewers identified eligible studies and assessed study quality. Data was extracted from studies, which included concussion mechanisms at ED presentation, ED management, and post-concussion outcomes. A descriptive summary of the evidence was generated, and sex and/or gender reporting was examined for accuracy according to Canadian Institutes of Health Research (CIHR) criteria.
Results: The search identified 4,801 citations; 126 studies were included in the analyses. Eighty (64%) studies reported sex/gender as demographic information, of which 51 (64%) included sex/gender in their analysis and 2 (3%) studies focused on a SGBA. Sex was more accurately reported than gender (94% vs 12%; $p < 0.0001$). Twenty-five (20%) studies utilized a SGBA for the extracted outcomes of interest. Males and females experience different mechanisms of concussion, 60% of studies documented that females received less CT scanning while in the ED (0.76 (95% CI: 0.66–0.98), and 57% of studies reported that post-concussion syndrome was more prevalent in females/women (1.59 (95% CI: 1.40–2.65).
Conclusion: This systematic review on concussion presentations to ED settings highlighted that sex is reported more accurately than gender, approximately half of studies did not report sex/gender as demographic information, and one-third of studies do not include SGBA. Males/men and females/women differed in concussion mechanisms at ED presentation, management, and concussion outcomes. These differences should be considered in future guideline development and concussion care to provide personalized prevention, assessment, and treatment recommendations.
Keywords: concussion, sex and gender-based analyses, emergency department

PO056

Auditing a recently implemented massive hemorrhage protocol in trauma: feasibility of assessing pre-specified metrics and compliance

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Background and Aim Statement: In 2021, Ontario implemented its first ever provincial evidence-based standardized Massive Hemorrhage Protocol (MHP). The objectives of this study are: (1) to describe the feasibility of auditing the protocol on pre-identified metrics, and (2) to assess the compliance with the provincial MHP at Sunnybrook Health Sciences Centre (SHSC) – the largest level 1 trauma centre in Canada.
Measures and Design: A retrospective chart review was performed of the most recent 54 consecutive MHP activations before and the first 59 consecutive MHP activations after the provincial protocol implementation on April 12, 2021. Fisher's exact tests were used to compare differences between the two groups on seven quality metrics.
Evaluation/results: In the pre-implementation group, the average age was 53 years, 63% were traumas, and the average length of stay (LOS) was 17 days. In the post-implementation group, the average age was 60 years, 56% were traumas, and the average LOS was 21 days. No difference between groups was found for the seven quality metrics: (1) RBC given < 15 min (91% vs. 95%, $p = 0.41$) (2)

Transitioning to group specific blood products within 90min (61% vs. 81%, $p = 0.08$); (3) Received tranexamic acid within 1 h (92% vs. 83%, $p = 0.51$); (4) Core temperature $> 35°C$ at protocol termination (86% vs. 76%, $p = 0.44$); (5) Patient's hemoglobin $> 60g/L$ in the first 24h (92% vs 85%, $p = 0.89$) and below 110g/L at 24h (64% vs 83%, $p = 0.05$); (6) MHP activation appropriate (> 6RBC within 24 h) (70% vs. 76%, $p = 0.53$), and (7) Blood products wasted (13% vs 22%, $p = 0.23$).

Discussion/impact: The overall auditing process was feasible and no significant pre- and post-implementation differences were identified. This quality audit allows centres to measure and compare compliance with the new Ontario MHP, and to flag areas in need of targeted improvement.

Keywords: quality improvement and patient safety, trauma, massive hemorrhage protocol

PO057

Impact of COVID-19 associated isolation on social isolation and loneliness in older people needing ED care

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Introduction: Older adults who use the emergency department (ED) have high rates of social isolation and loneliness (SIL) which increases mortality and morbidity as much as smoking. Older adults who use the emergency department (ED) have high rates of social isolation and loneliness (SIL) which increases mortality and morbidity as much as smoking. Our objectives were to assess the impact of isolation associated with COVID on SIL in older people who need ED care.

Methods: We recruited people 70 years of age or older referred by the Family Practice team at Mout Sinai, or discharged from the ED at Mount Sinai Hopsital and North York General Hospital. We excluded those living in a nursing home, critically ill, unable to communicate, with no phone, previously enrolled and those in the ED for > 72 h. Potential participants were telephoned within 1 week of ED discharge. Consenting eligible patients rated their current loneliness on the validated 6 item DeJong scale. They were then asked if this was better, the same or worse due to COVID on a 5 point likert scale. We report the proportion of participants that stated their loneliness was a little worse or much worse since Covid, stratifed by their current loneliness (DeJong score $> = 2$, or at high risk for loneliness) with 95% Confidence Intervals (CI) where appropriate.

Results: Of 3996 potential participants screened, 51.9% were ineligible, 11.3% refused, and 12.9% were missed leaving 956 (23.9%) participants, of which 61.6% female. Their mean age was 78.2 years. The proportion that stated they felt "a little/much more" to each of the 6 items of the DeJong scale by risk of loneliness are as follows: Experience a general sense of emptiness 12.6% (10.1–15.6) vs 52.3% (47.2–57.7)

Miss having people around me: 50.3% (46.2–54.4) vs. 74.6% (69.8–79.0)

Often feel rejected: 2.0% (1.1–3.5) vs 17.1% (13.4–21.4)

Plenty of people I can rely on: 9.8% (7.5–12.4) vs24.9% (20.5–29.6)

Many people I trust completely: 2.2% (1.2–3.7) vs 11.9% (8.7–15.7)

Enough people I feel close to: 12.5% (9.9–15.4) vs 23.8% (19.5–28.5)

Conclusion: Participants who were currently at high risk for loneliness reported that this was a "little worse" or "much worse" significantly more for all 6 items of the DeJong scale compared to those not at risk.

Given the likelihood of future pandemic isolation, interventions to improve SIL and outcomes in older people are needed.

Keywords: geriatric emergency medicine, loneliness, mental health

PO058Closing

the gap in access to HIV testing: implementation and outcomes of a protocol for rapid HIV testing in the emergency department

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Introduction: In Canada, 1 in 7 persons living with HIV do not know their HIV status. Emergency department (ED) visits are a missed opportunity for HIV testing: while they are often the only point of contact for many high-risk populations, most EDs do not offer rapid HIV testing. Previously in Toronto, HIV testing for ED patients was sent offsite to public health laboratories causing lengthy delays and uncertain follow-up. To improve access to real-time ED HIV testing, we aimed to design, implement and evaluate a rapid HIV testing protocol in two large, urban, academic EDs.

Methods: We conducted a cross-Canada environmental scan on existing protocols for ED HIV testing and then a barriers and facilitators exercise within our two affiliated hospitals in Toronto. We developed a targeted testing protocol with ED, hospital, public health and patient stakeholders. The protocol includes patient and provider-initiated testing criteria (i.e. patient requests test, risk factor and/or clinical condition related to HIV identified in care), standardized counseling scripts, and a rapid pathway for linkage to care. ED providers were given educational sessions and standardized counseling scripts. HIV testing was conducted in the core laboratory on venous samples (HIV Ag/Ab; Abbott Architect Immunoassay). Data was collected retrospectively for turnaround time (TAT), testing indications, linkage to care and clinical outcomes.

Results: Previously, no rapid ED HIV testing was available and median TAT for results was 109 h. In the 11 months after implementation, 285 HIV tests were completed with a median TAT of 2.5 h. Overall, 10 patients (3.5%) tested HIV positive; 3 subsequently disclosed they had known their status/were lost to follow-up and 7 were new HIV diagnoses. All newly diagnosed patients were tested for a combination of risk factors and clinical conditions associated with HIV. Three patients were admitted to hospital (all PJP pneumonia) and 1 to ICU for respiratory failure (COVID). Five (71%) patients were successfully linked to follow-up care: 4 were linked to the hospital HIV clinic, and 1 was followed in the community. Further, 1 patient remained in ICU and 1 had moved provinces.

Conclusion: Responsive design of a rapid HIV testing protocol demonstrates the feasibility of HIV testing in the ED and successful linkage to HIV care. Future directions include scaling to Thunder Bay (underway) and a combined process evaluation to develop best practices for rapid HIV testing in Canadian EDs.

Keywords: HIV/AIDS, rapid testing, linkage to care

PO059

Describing emergency department super-users and their exposure to computed tomography imaging: retrospective cohort study

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Introduction: High frequency users of the emergency department (ED) often represent a variety of at-risk populations including those with mental health, addictions and who are unhoused. They present to the ED with an assortment of chief complaints, are often heavy resource users and commonly experience repeated imaging such as computed tomography (CT). The purpose of this study was to describe this population at an isolated tertiary care centre in northwestern Ontario in terms of demographics, presenting complaints, disposition and to estimate the lifetime attributable risk (LAR) of cancer due to repetitive CT imaging.
Methods: This was a retrospective cohort study of electronic medical record (EMR) data from 2005 to 2017. Super-users were defined as patients who visited the ED $\geq$ 25 times in 2017. A chart review was conducted to collect data related to presenting complaints, patient demographic, disposition and type of CT. Using this data the total effective radiation dose (mSv) was then determined for each patient. LAR was then approximated using the ratio presented in BEIR VII report.
Results: There were 85 super-users with 12,131 collective visits and a mean of 162 visits. The total number of CT scans was 1771, with an imaging rate of 1.5 scans per 10 visits. CT head imaging made up 50% of scans with the next most prevalent being CT abdomen and pelvis at 21%. The most common presenting complaints were addiction/mental health and gastrointestinal, both accounting for a total of 23% of visits. The total effective radiation dose for each patient ranged from 4 to 1071mSv with a mean of 153mSv resulting in a LAR of 1.5%. Of note, 64% of super-users were under 49 years of age with the most prevalent demographic being 40–49 years of age. However, these individuals did not have the highest average radiation exposure level per individual which occurred in 60–69 year old males (299.8 mSv) and females (407.7 mSv).
Conclusion: CT imaging of ED super-users is very common and potentially harmful. The high rates of imaging likely relate to the higher risk lifestyles of many from this population, physician desire to provide the best possible care during each visit and medical-legal liability concerns. Targeted public health and primary care strategies that reduce ED visits within this population would decrease potential radiation exposure to this population and be beneficial.
Keywords: computed tomography, lifetime attributable risk, super-users

PO060

Effectiveness of case management interventions for adult patients with frequent emergency department use who experience homelessness or unstable housing

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Introduction: Case management (CM) is a widely discussed intervention for frequent users of the emergency department (ED). Previous systematic reviews have examined the effectiveness of CM for heterogeneous groups of frequent ED users, with mixed results. This review aims to evaluate the effectiveness of CM interventions *o*n acute care service use, health outcomes and social determinants of health (SDOH) for frequent ED users experiencing homelessness.
Methods: A systematic review protocol was registered with PROSPERO (CRD42022340095). A literature search of eight electronic databases by an expert librarian identified studies examining CM interventions for frequent ED users experiencing homelessness. Two reviewers independently screened studies, extracted data and evaluated study quality. Due to high heterogeneity, a descriptive summary of the results was conducted.
Results: From 665 unique studies, eight studies met the inclusion criteria consisting of four before-and-after studies, two prospective cohorts, and one RCT. Overall study quality was poor. All studies were conducted in North American urban EDs. The definition of frequent ED users varied across studies. The impact of CM interventions on subsequent ED utilization was mixed, as four studies reported a significant decrease in ED visits among patients receiving CM interventions, while no significant differences were found in three studies. Two studies reported a significant decrease in inpatient admissions, as well as an increase in outpatient visits among patients receiving CM interventions. Six studies reported that the majority of participants who underwent the CM interventions accepted referrals to permanent housing. Three studies reported sustained reductions in homelessness, with most of the participants maintaining housing for longer than six months. Three studies reported total costs, two of which reported overall cost savings while one study showed no change in service costs but improvements in housing and ED utilization.
Conclusion: There is evidence that CM interventions may decrease ED utilization and improve permanent housing for homeless individuals who are frequent ED users without increasing costs. The overall quality of the evidence from included studies is weak and additional high-quality studies are urgently needed. This review informs the design, data collection and reporting of future ED-based CM intervention programs, and highlights research gaps.
Keywords: case management, frequent users, homeless or unstable housing

PO061

Emergency physician deviation from pulmonary embolism diagnostic protocol

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Introduction: As part of a prospective management study (the PEGeD study, NCT02483442), we implemented an evidence-based pathway for pulmonary embolism (PE) testing in two academic emergency departments (EDs) 2016–2018. The aim of this study was to identify factors associated with the emergency physician not following (deviating from) the PEGeD PE testing pathway.
Methods: Emergency physicians documented the Wells score on hard copy PEGeD pathway forms which guided diagnostic imaging use. Patients were included if they had a PEGeD pathway form completed in the ED. Patients were excluded if the Wells score was not documented, the patient identity was missing, the form was a duplicate, or the form was missing. Patient visits were classified as having PE testing in adherence with or else deviating from the PEGeD pathway. We defined deviation from the PEGeD pathway as ordering PE imaging in patients with Wells score $\leq$ 4.0 and D-dimer $<$ 1000 ng/ml or Wells score of 4.5–6.0 and D-dimer $<$ 500 ng/ml. Patient data were collected from electronic medical records. Adjusted odds ratios (aORs) were calculated for prespecified predictors of deviation from the PEGeD pathway: patient age, sex, day of the week, time of day,

cancer, prior venous thromboembolism (VTE), systolic blood pressure, CTAS score and referral for admission. The multivariable logical regression analysis was clustered by individual physician.
Results: In total, 1570 PEGeD forms were received and 78 were excluded because of 42 incomplete forms, 15 cases with no patient identity, 16 missing forms, and 5 duplicate forms. 1492 patients were included in the analysis (mean age 55, 62% female, 26% presented at weekend, 44% presented after 4pm, 19% cancer, 13% with prior VTE, 3% systolic BP < 100, 46% CTAS 1/2, 27% referred for admission). The physician deviated from the PEGeD PE testing pathway in 97/1492 patients. Presenting to the ED on a weekday versus weekend was associated with deviation from the PEGeD pathway (aOR 1.83; 1.04, 3.21). There was a trend towards association with deviation from PEGeD pathway for CTAS 1/2 patients (aOR 1.53; 1.00, 2.35) and those with cancer (aOR 1.62; 0.99, 266). No other prespecified variables were associated with deviation from the PEGeD pathway.
Conclusion: In this retrospective analysis of data collected for a prospective cohort study, deviation from the PEGeD PE testing pathway was associated with being tested during the week compared to the weekend.
Keywords: pulmonary embolism, computed tomography, diagnosis

PO062

The role of gender on the clinical practice of emergency medicine in Canada

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Introduction: While women comprise about half of current Canadian medical students and physicians, only 31% of emergency medicine (EM) physicians identify as women. Gender-based bias and discrimination continues to have an impact in medicine and can affect the career choice, progress, and well-being of women trainees and physicians. Although instances of gender-based bias are well documented within other specialties in medicine, there remains a gap in literature addressing the role of gender specific to the Canadian EM clinical environment.
Methods: Participants were purposively and snowball sampled from a cross-section of urban, community, and rural centers across Canada. Interviews were conducted with 17 woman-identifying and 17 man-identifying emergency medicine attending physicians, residents, and clinical clerks. Data analysis utilized inductive and deductive approaches with thematic analysis guided by Braun and Clarke. Trustworthiness and credibility were ensured through strategies of reflexivity, triangulation, and appropriate intercoder reliability.
Results: Analysis revealed six themes that describe the role of gender within EM clinical practice. First, women disproportionately experience gender bias in the form of *microaggressions*. Second, women are more likely to experience *imposter syndrome* and question their role in the clinical setting because of compounding experiences of gender bias. Third, women patients and vulnerable populations prefer women providers for sensitive aspects of *patient care*. Fourth, there are gender-related challenges with family planning and home responsibilities that affect *work-life balance*. Fifth, *allyship and sponsorship* are important for the support and development of women physicians and trainees. Sixth, women value discussing *shared experiences* with other women to debrief situations, find mentorship, and share advice.
Conclusion: These results demonstrate that gender inequity is prominent within the EM clinical environment and disproportionately affects women providers. Through describing the experiences of providers across Canada we highlight several avenues to implement change. Avenues include gender equity training incorporated into simulation; bystander awareness workshops; standardized parental leave policies; and safe spaces for discussion, support, and sponsorship for all providers. We encourage institutions to consider these recommendations in an effort to achieve gender-equitable conditions in EM across Canada.
Keywords: gender equity, clinical practice, emergency medicine

PO063

The balanced scorecard: Design and automation of an audit and feedback tool to optimize emergency physician practice feedback

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Background and Aim Statement: The predicted rise in annual healthcare spending, from $144.3 to $362.6 billion by 2030, has highlighted a need to prioritize the sustainability of Canadian healthcare. Emergency department (ED) physicians have a significant role in providing sustainable healthcare and have expressed strong interest in receiving personalized feedback on practice. Audit and feedback (AF) approach is effective in providing individualized feedback to improve evidence-based practices in healthcare settings. Physician data required for AF methods are easily retrievable from most electronic medical records. However, there is no validated open-access tool for convenient implementation of AF initiatives in Canadian EDs.
This project aims to develop and demonstrate the utility of a balanced scorecard template for ED physician feedback delivery that is open-access, automated, consensus-based, and easily interpreted.
Measures and Design: Best-practice recommendations were incorporated in the design of the scorecard template. Individual meetings with emergency physicians were conducted to obtain feedback regarding the template design. The impact of the scorecard template on physician performance will be assessed in an AF study in a cohort of ED physicians at Hôpital Montfort, Ottawa.
Evaluation/results: The scorecard template is a single-page dashboard that reports data on any five ED metrics of choice. Metrics in this project have been chosen based on a 2020 Canadian regional needs assessment for ED physician AF: productivity, patient outcomes, resource utilization, return to ED rates, and consultation rates. For each metric, the scorecard displays anonymized comparisons, numerically, graphically and verbally, between individual scores and group medians. The scorecard also features data on the current period of interest and on trends overtime. We subsequently interviewed ED physicians ($n = 4$) who all preferred bar graphs over boxplots for data presentation, found the overall design user-friendly, and were enthusiastic to adopt this initiative in their EDs.
Discussion/impact: The design and automation of an open-access scorecard template allows for a national standard as well as project scalability. The scorecard template will be piloted in an AF study for a cohort of ED physicians at the Hôpital Montfort. We hope to demonstrate the effectiveness of this AF approach in facilitating evidence-based behaviour modification and to encourage the use of this open-access scorecard in other Canadian EDs.
Keywords: scorecard, audit, feedback

PO064

An accelerated diagnostic protocol for patients with cardiac chest pain using conventional troponin I on emergency department length of stay: a single site retrospective cohort study

J. Hill, E. Yang, D. Lefebvre, S. Doran, J. Raizman, A. Tsui, B. Rowe

Introduction: The objective of this study was to assess the impact of the implementation of an accelerated diagnostic protocol (ADP) using shortened serial testing intervals and a conventional troponin I on emergency department (ED) length of stay (LOS), consultation rates, and patient outcomes.
Methods: We conducted a retrospective cohort study of all adults ($\geq$ 18 yr) presenting to a tertiary-care, urban, Canadian ED who were triaged with a primary presenting complaint of chest pain of cardiac origin and a Canadian Triage and Acuity Scale (CTAS) score of 2 or 3 between January 14, 2017, and January 15, 2019. For low-risk patients, the troponin delta timing decreased from 6 to 3 h on January 15, 2018. Population-based linked health administrative data from Alberta Health Services were obtained. The primary outcome was ED LOS. Secondary outcomes included consultation proportions, disposition status (i.e., admission or discharge), and Major Adverse Cardiac Events (MACE) within 30 days of the index ED visit. Cohorts included patients pre- and post- implementation of the ADP using a conventional troponin assay.
Results: There was a total of 3133 patient interactions included in the study period, with 1531 in the pre-ADP group and 1602 in the seasonally matched post-ADP group. Median ED LOS was 401 minutes for the pre-ADP group and 371 minutes for the post-ADP group (Median difference = 30; 95% CI: 11.2–48.8). Among patients who were discharged, there was a decrease in LOS by 33 minutes (95% CI: 12.4–53.6 min) in the post-ADP group. Consultations were unchanged between the groups (36.1% before vs. 33.8% after; $p = 0.17$). Admission proportions were similarly unchanged (25.3% before vs. 23.8% after; $p = 0.31$). The MACE outcomes did not change following the implementation of an ADP (15.9% vs. 15.3%; $p = 0.62$).
Conclusion: The implementation of an ADP , with a conventional troponin I, for chest pain in a tertiary care Canadian ED was not associated with a significant reduction of LOS for all patients; however, there was a significant reduction for patients who were discharged. Moreover, this strategy was safe with no increase in adverse outcomes. Further research on refining chest pain protocols appears warranted.
Keywords: troponin, chest pain

PO065

Effect of the introduction of a high sensitivity troponin I and associated diagnostic protocol on emergency department length of stay: a single site retrospective cohort study

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Introduction: Chest pain is a common presenting complaint in emergency departments (ED) in developed countries. Despite its frequency, the majority of patients can be discharged home; however, they spend considerable time in the ED and consume valuable resources. The objective of this study was to assess the impact of the introduction of a high-sensitivity troponin I (hs-TnI) assay and its associated accelerated protocol on ED length of stay (LOS) for patients presenting with chest pain, compared to an ADP using conventional troponin (c-TnI) testing.
Methods: We conducted a retrospective cohort study of all adults ($\geq$ 18 yr) with a primary presenting complaint of chest pain of cardiac origin and a Canadian Triage and Acuity Scale (CTAS) score of 2 or 3 between November 8, 2019, and November 9, 2021 to a tertiary care urban Canadian ED. The hs-TnI was introduced on November 9, 2020. Population-based linked health administrative data from Alberta were obtained. The primary outcome was ED LOS. Secondary outcomes included consultation proportions, disposition status (i.e., admission or discharge), and Major Adverse Cardiac Events (MACE) within 30 days of the index ED visit.
Results: Overall, 2640 patients presenting with chest pain were included during the study period, with 1333 in the TnI group and 1307 in the hs-TnI group. Median ED LOS was decreased significantly after the introduction of the hs-TnI; 392 minutes for the TnI group and 371 minutes for the hs-TnI group (Median difference = 21 minutes ; 95% CI: 5.3, 36.7). Among patients who were discharged, there was a significant decrease in LOS of 34 minutes (95% CI: 18.1, 49.9) following the implementation of the hs-TnI assay. Consultations and admissions were not statistically different between study periods. Before hs-TnI introduction, 37.4% of patients had specialist consultation, compared to 33.8% after ($p = 0.06$). Admission proportions were 25.1% and 23.9% before-and-after hs-TnI use, respectively ($p = 0.48$). The MACE outcomes did not change following the implementation of the hs-TnI test (13.6% vs 13.1%; $p = 0.71$).
Conclusion: The implementation of an accelerated CP protocol using a hs-TnI assay in a tertiary care Canadian ED was associated with a modest reduction of LOS for all patients and a substantial reduction for patients undergoing serial testing. Moreover, this strategy was safe with no increase in adverse outcomes. Further research on protocol adherence and pathway refinement appears warranted.
Keywords: troponin, overcrowding, efficiency

PO066

Feasibility of smartwatches in post-COVID health status tracking: toward scalable remote patient monitoring in the ED

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Background and Aim Statement: Smartwatches are increasingly accurate at detecting vital signs, are inexpensive and easy to operate, and hold promise as tools for remote patient monitoring (RPM). The COVID pandemic has highlighted the potential safety benefits of post-discharge RPM in the ED, especially in remote/rural settings. This study aimed to determine the feasibility characteristics of smartwatches in health status tracking for post-COVID patients.
Measures and Design: This prospective feasibility trial enrolled patients rehabilitating at home from acute COVID in remote/rural Alberta. Patients were asked to wear a Fitbit Charge 2 device continuously and device metrics were extracted for analysis (e.g. heart rate, sleep, and activity). Electronic patient reported outcome measures (e-PROMS) for mental (bi-weekly) and physical (daily) health were collected via SMS text and email. Exit surveys and semi-structured interviews evaluated the patient experience. The primary outcome was proportion of time (study-hours) with usable heart rate data. Secondary measures included completion rate for e-PROMs, patient satisfaction, patient-perceived clinical utility and mental health impacts.
Evaluation/results: Of 17 eligible patients, 11 agreed to participate. The mean age was 52 yrs and 73% were female. Five patients (45%) were hospitalized (avg. stay 41 days) and 4 required mechanical ventilation; 6 already owned a smartwatch. The most prominent physical symptoms were fatigue, muscle weakness, headache, and dyspnea. On average, patients had moderate to severe anxiety (GAD 7 = 15.8), depression (PHQ-9 = 19.9), and stress (PSS = 26.6). A total of 21,040 patient-hours were monitored, averaging 1913 hrs per patient (SD = 1396). Heart rate data was usable for 83% of study-hours. Surveys were completed 83% and 72% of the time for mental and physical health, respectively. Survey scores were favorable for

usability/acceptability (3.9/7), perceived clinical utility (3.5/7) and mental health impacts (3.8/7). Interviews revealed overall positive patient experience with varying concerns about data privacy/security.
Discussion/impact: Smartwatches are feasible tools for RPM, especially given their usability, affordability, and patient acceptance. We will present preliminary estimates for longitudinal associations between smartwatch parameters and e-PROMS. Future work will aim to develop tools for predicting and preventing ED visits/revisits with continuously collected smartwatch data and machine learning.
Keywords: wearable devices, remote patient monitoring, COVID-19

PO067

ED opioid prescriptions are associated with long-term use and higher ED utilization in patients with migraine

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Introduction: Migraine headaches cause severe pain and are a common reason for ED visits. Opioids provide effective analgesia but may lead to opioid use disorder (OUD) and long-term use (LTU). We aimed to quantify the risks of prescribing opioids for ED patients with migraine and to compare opioid formulations.
Methods: This retrospective cohort study used linked administrative data to study a random sample of 1 million adults (>17 years) presenting to Alberta EDs between 2010 and 2019. We excluded palliative and pregnant patients, as well as those with cancer, pre-existing opioid use disorder (OUD) or long-term opioid use (LTU). Patients who received an opioid prescription early in the study were eligible for re-enrollment if they survived a 1-year washout period without an outcome event. The primary OUD/LTU outcome during 1-year follow-up was a composite of opioid-related ED visit, new OAT prescription, positive opioid toxicology testing, hospitalization, evidence of LTU based on CSOR criteria, or all-cause mortality. Secondary outcomes included ED revisits (a marker of treatment failure) and components of the primary outcome. We used propensity score matching (PSM) to create a control group at similar risk to opioid-exposed patients.
Results: After exclusions, 36,496 ED visits by 23,045 unique patients were studied. Opioids were prescribed after 1058 visits (2.9%), including 61% codeine, 25% tramadol, 7% oxycodone and 4% potent opioids (hydromorphone, morphine, fentanyl). Mean age was 35 years, 78% were female, 8% had an affective disorder, 2% had a non-opioid substance use disorder, and 34% had filled an opioid prescription in the previous year. Exposed and control groups were well matched on 18 key covariates. Primary outcome events occurred in 23% of exposed and 15% of control patients and matched analysis revealed 60% increased odds of the outcome in the exposed (OR $=1.6$ [CI 1.3–2.0]). While codeine was associated with increased risk (OR $=1.6$ [CI 1.2–2.1]), odds ratios for other formulations did not reach statistical significance: Tramadol OR $=1.0$ (0.7–1.7); Oxycodone OR $=1.3$ (CI 0.6–2.7); 'Other Potent' agents OR $=1.0$ (CI 0.3–3.0). Opioid prescriptions overall were also associated with higher risk of LTU (OR $=1.5$[CI $=1.1$–2.2]), all-cause hospitalization (OR $=1.5$) 72-h (OR $=2.9$), 7-day (OR $=2.7$) and 14-day (OR $=2.4$) ED returns.
Conclusion: In patients with migraine, ED opioid prescriptions are associated with substantially increased risk of subsequent LTU and ED utilization.
Keywords: opioids, long term use, migraine

PO068

Emergency department opioid prescribing is associated with increased risk of long-term use

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Introduction: Prescription opioid use is associated with subsequent long-term use (LTU), but the risk of an emergency department (ED) opioid prescription is undefined. Our objective was to determine whether ED opioid prescription increases the risk of subsequent LTU.
Methods: We performed a retrospective cohort study using linked administrative data. Our source population included all 18.1 million Alberta ED visits between 2010 and 2019. We excluded patients with a palliative diagnosis, cancer, pregnancy and evidence of pre-existing opioid use disorder (OUD) or LTU. The primary composite outcome during 1-year follow-up was: opioid-related ED visit, new OAT prescription, positive opioid toxicology testing, hospitalization, evidence of LTU based on CSOR criteria, or all-cause mortality. We used propensity score matching (PSM) to create a control group at similar risk to opioid-exposed patients. Patients who received a prescription early in the study were eligible for re-enrollment if they survived a 1-year washout period without an outcome event.
Results: After exclusions, 13,958,945 visits were analyzed. The exposure and control groups were almost identical on 18 potential confounders, including age, sex, pain type, mental and physical comorbidities, and previous opioid exposure. Mean age was 42 years and 52% were female; 19% had a mood disorder; 4% had alcohol use disorder, and 24% had filled an opioid prescription in the year prior to their index visit. Opioids were prescribed at 5% of visits. In matched data outcome analysis, an opioid prescription was associated with 8% higher odds of the primary outcome (OR $=1.08$ [CI 1.08–1.1]).
Conclusion: An ED opioid prescription is associated with a $\sim 9\%$ relative increase in subsequent LTU. Prior studies report a wide range of risk estimates based on specific subgroups while our estimate is population-based. We will present risk estimates for key subgroups defined by age, sex, prior opioid exposure, pain type, opioid type and mental health comorbidity. Future work should delineate risk factors in detail, including prescription characteristics, and enable precise risk prediction for safer prescribing.
Keywords: opioids, long term use, opioid use disorder

PO069

Understanding how exemplary leaders foster effective teamwork in high stakes environments of the emergency department (ED)

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Introduction: High-stakes emergency department (ED) patient care requires interprofessional teams to function in time-sensitive, complex, stressful, and emotional situations. Whereas the impact of leadership on patient outcomes in high stakes scenarios has been well-established, there remains limited understanding of how exemplary ED team leaders foster effective teamwork, and what qualities these leaders possess that allow them to do so.
Methods: We conducted a qualitative descriptive study with thematic analysis of semi-structured interviews with interprofessional team members and exemplary team leaders, recruited by purposive

snowball sampling. Our objectives were to (1) understand how exemplary ED leaders and interprofessional team members perceive optimal high-stakes leadership; (2) highlight the qualities and strategies that exemplary ED leaders possess and employ as they lead high-stakes patient care teams.

Results: Whereas participants emphasized that there is no single "archetype" of exemplary ED leadership, leaders and team members jointly identified a core set of essential leadership strategies for optimal team function: building collaborative spaces through frequent case summaries and encouraging team member feedback, delegating responsibilities in ways that match team member preference and skill, identifying priorities while thinking ahead, and managing noise level and chaos. Exemplary leaders were universally described as being confident, calm, personable, respectful, and empathetic. Participant groups differed in their perspectives on how a leader should identify themselves, how much a leader should pitch in, and in what tone a leader should use to address team members.

Conclusion: Our study outlines specific qualities and strategies that exemplary leaders possess and employ to better foster teamwork and optimal patient care in high-stakes scenarios. Lessons learned may be used to inform future resident and professional development programs that seek to develop stronger leaders who are better equipped to help patients in life-threatening scenarios in the ED.

Keywords: leadership, interprofessional team function, high-stakes resuscitation

PO070

Field trauma triage criteria associated with need for dedicated trauma center care: a single center retrospective cohort study

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Introduction: Paramedics in Ontario use the Field Trauma Triage Standard (FTTS) to assess whether patients require care at a trauma center. Patients are assessed for physiological, anatomical, mechanism of injury, and special criteria. Meeting any one of these criteria allows paramedics to bypass the closest hospital and transport the patient to a trauma center. The objective of this study was to explore the association of each of the criteria in the FTTS and the "need" for trauma centre care, defined as any one of: transfusion in the trauma bay, taken to operating room (OR) withing 4 hours of arrival, admitted to intensive care, death within 48 hours of arrival, or injury severity score (ISS) above 15.

Methods: This was a retrospective cohort study of all direct from scene trauma team activations at a single level 1 trauma centre between January 2020 and December 2021. Patients were excluded if they were an interfacility transfer or were not brought to hospital by paramedics. Each chart was reviewed to determine which FTTS criteria were met. Descriptive statistics were performed on FTTS criteria being met and hospital-based trauma centre need (TCN) and injury score based TCN.

Results: A total of 1406 patients were included with a mean age of 44 years (± 19.2), 75.8% were male, median ISS 8 (IQR 1–17). In total 1169 (83.1%) of patients met at least one of the FTTS criteria. In the entire population, hospital-based TCN was demonstrated in 168 (11.9%) patients who required blood products in the trauma bay, 150 (10.6%) were sent to the OR within 4 hours of arrival, 248 (17.5%) were admitted to the ICU, and 77 (5.4%) patients died within 48 hours of admission. Patients who met FTTS were more likely to receive blood products in the trauma bay (12.8% vs 6.8%, $p < 0.01$), more likely to require OR within 4 hours of arrival (11.3% vs. 7.2% $p = 0.07$), more likely to require ICU admission (18.5% vs. 12.7%, $p = 0.03$), and more likely to die within 48 hours of admission (4.0% vs. 1.3%, $p < 0.01$). Injury-based TCN was met in 403 (28.7%) of patients. Patients who met the FTTS had a higher ISS (mean 11.3 vs. 8.4, $p = < 0.01$).

Conclusion: This study shows that show that there is an association between hospital-based and injury-score based TCN and patients meeting any of the FTTS criteria. An understanding of the predictive accuracy for FTTS on TCN can help identify refinements to the FTTS to balance overtriage and undertriage within the Ontario trauma system.

Keywords: trauma center need, field trauma triage, trauma systems

PO071

Impact of peer support workers on security activations in the emergency department: a retrospective cross-sectional analysis

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Introduction: During the COVID pandemic, Peer Support Workers (Peers) were integrated into Emergency Departments (EDs) at University Health Network (UHN) to support patients from equity-deserving groups. Peers have been shown to reduce ED visits, hospital admissions, and length-of-stay. Peers aid patients in managing emotions and support with de-escalation when required. Patients from equity-deserving groups may have experienced prior harm from interactions with security and police; reducing exposure to security personnel may support the provision of trauma-informed care in EDs. This study assessed the impact of the pandemic on security utilization (SU) in our ED and the impact of Peers on SU during that period.

Methods: This was a retrospective, cross-sectional analysis. Deidentified SU data and total ED visits from the UHN EDs from Jan 2018 to May 2022 were obtained. SU was classified by type, duration and time of activation. The data was divided into two periods: pre-pandemic (Nov 2018-Apr 2019) and during-pandemic (Nov 2021-Apr 2022). SU events were classified into times when Peers were present vs. absent from the ED. SU events per 100 ED visits (total SU and SU subtypes) were compared for the pre- and during-pandemic periods. SU were further compared between Peer present and absent hours for each period. Descriptive statistics were reported, and a Poisson regression model was constructed to evaluate the impact that Peers had on SU between the two periods.

Results: There were 1359 SU events in the pre-pandemic period and 1734 during the pandemic period. SU events per 100 ED visits increased during the pandemic both with Peers present (1.84 pre-pandemic vs. 2.69 during) and absent (2.71 vs. 3.77). All SU subtypes increased regardless of Peer presence except Patient Standby, which increased with Peer presence (0.30 pre-pandemic vs. 0.42 during) and decreased with absence (0.37 vs. 0.33). Restraint use increased with Peer presence (0.48 pre-pandemic vs. 0.54 during) and absence (0.60 vs. 0.92). The regression model did not find a significant interaction between Peer presence and total SU or SU subtypes.

Conclusion: SU increased in our ED during the pandemic, regardless of Peer presence. We did not find a statistically significant impact of Peers on SU in this dataset; our analysis was limited by the retrospective, cross-sectional approach. Further research is needed to explore the impact of Peers on SU, particularly restraint use and security standby patterns.

Keywords: security, peer support workers, restraints

PO072

Variations in practice for managing opioid overdose are caused by knowledge gaps, scarce resources, and lack of standardized protocols: findings from a national survey of emergency physicians

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Introduction: Patients who present to the ED frequently are at increased risk of overdose. In addition, ED initiation of buprenorphine-naloxone (BUP) leads to higher rates of treatment engagement and decreased opioid use. It is therefore imperative for ED physicians to be able to identify patients with OUD and feel confident in the management of opioid overdose including post overdose management and monitoring and initiation of BUP.
Methods: We distributed an anonymous online survey - *Code Overdose: What are docs doing after naloxone?* - through CAEP. We received 179 responses from staff and learner emergency physicians. Data were analyzed with descriptive statistics.
Results: Amongst staff (87.15%) and learner emergency physicians (12.8%), most observed $\geq$ 1-2 suspected opioid overdoses in the past 3 months (92.74%), with some reporting $\geq$ 11 (21.79%). Respondents had access to naloxone distribution and education (70.95%), order sets, policies, or procedures for care after opioid overdose (26.82%), peer workers (21.91%), as well as safer injection (14.53%) and smoking (2%) supplies. Few had additional formal training in addictions medicine (12.85%). While some respondents (61.24%) reported BUP being stocked in their ED, others never offer it to patients (25.14%), and only some refer patients to outpatient addictions clinics (43.58%). Barriers to monitoring patients for sufficient duration include patient preference to leave against medical advice (94.41%), no standard protocols (70.39%), and uncertainty of adequate observation duration for post-naloxone reversal (46.92%). Patient observation periods post-naloxone administration varied greatly: respondents reported observing patients for: $<$ 1 h (1.12%); 1–2 h (17.32%) 2–3 h (24.58%); 3–4 h (20.67%); 4–6 h (18.99%); $>$ 6 h (3.91%). Further, few consult for admission for observation after naloxone administration (1.68%).
Conclusion: There are vast gaps in knowledge for opioid overdose management in both staff and learner emergency physicians nationwide, and a dearth of appropriate resources available to support people experiencing OUD in EDs. Therefore, there is a clear need to improve education surrounding the management of OUD and post overdose monitoring and care in EDs, and physicians must advocate for access to greater dedicated harm reduction resources in their EDs. Standardized protocols that physicians could use to manage patients who present with opioid overdose, and options for further counselling or treatment, are promising areas to improve.
Keywords: opioid overdose, buprenorphine-naloxone, harm reduction

PO073

Transitions of care for older adults after a visit to the emergency department: a thematic content analysis

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Introduction: Older adults are frequent users of emergency departments (EDs), which imparts substantial risk for revisits, hospital admission, and mortality. Improving care transitions from EDs to the community can minimize returning to the ED, adverse events, and may empower older adults to independently manage their care and continue living well in their communities.
Methods: We conducted an inductive qualitative content analysis to identify themes emerging from participant comments to determine the experiences and concerns of patients undergoing ED care transitions. We randomly selected participant comments until we reached saturation from an ongoing prospective longitudinal observational cohort of older adults ($\geq$ 65 years) who experienced a care transition after an ED visit from both pre and post COVID-19 periods. We also coded each comment to determine the emotional valence (positive, negative, or neutral) of each theme.
Results: Comments from 690 patients (50.9% women; M age = 75 years; SD = 7.2) were analyzed. The majority of patients were discharged home from the ED before March 2020 (when the COVID-19 public health emergency was declared; N = 351, 50.8%), and 35.8% of patients had caregivers. Quality of care was the most frequently reported theme (79.4% of all comments), followed by communications and referrals between departments (53.1%), departure and discharge from the ED (33.9%), home services designed to facilitate independent community living (14.1%), and professionalism of staff (11.6%). Patients were satisfied with acute emergency care, and the proportion of patients with positive acute care experiences increased over the COVID-19 pandemic (+26.4%). The proportion of positive patient comments about departure and discharge also increased after the start of the COVID-19 pandemic (+13.8%). Negative patient comments were related to communication between health systems and professionalism. The frequency of positive comments relating to home care decreased over the COVID-19 pandemic in favor of more neutral comments (+11.2%).
Conclusion: We identified different patient-reported themes that may guide future quality improvement initiatives to improve ED care transitions. These themes concern: acute care, communications between departments, ED departure and discharge, home services, and professionalism of staff. Understanding the ongoing impact of the COVID-19 pandemic on care transitions should also be monitored as health care systems reorganize their services in the post-pandemic era.
Keywords: care transitions, patient experience, aging

PO074

HEADSTRONG: Helmet education, awareness, distribution and social media trial to reduce obstacles and nudge group behavior: twelve month follow-up

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Introduction: We sought to characterize unhelmeted injured cyclists presenting to the emergency department (ED), and to assess an intervention using principles of behavioral economics to increase sustained helmet use in adult cyclists.
Methods: Prospective cohort study (consecutive, convenience sample) in a downtown teaching hospital in Toronto, Canada from May 2016 to September 2019. Injured cyclists presenting to the ED were recruited if unhelmeted at time of injury and over age 18. Exclusion criteria included inability to consent (language barrier, cognitive impairment) or admission to hospital. The HEADSTRONG protocol aimed to promote sustained helmet use by providing: (1) Education in ED, (2) Free bicycle helmet, (3) Four email follow-ups (f/u) over 12 months, (4) social media engagement, (5) Peer nomination of a colleague for enrolment at one year month f/u. A standardized survey and f/u questions were administered by a research coordinator (D.P.).

Patients were randomized to HEADSTRONG protocol or control group (baseline survey and 12 month f/u).
Results: We enrolled 72 UICs (unhelmeted injured cyclists) with mean age of 34.3 years (range 18–68, median 30, IQR 15.8 years) in 27 months of recruitment. Almost all (98.6%, n = 71) had planned to cycle when departing home that day. UICs reported rarely (11.1%, n = 8) or never (65.3%, n = 47) wearing a helmet. Reported factors discouraging helmet use included inconvenience (31.9%, n = 23) and lack of ownership (33.3%, n = 24), but few characterized helmets as unnecessary (11.1%, n = 7) or ineffective (1.4%, n = 1). Of the 26 (36.1%) cyclists randomized to HEADSTRONG protocol, 16 (62.6 %) responded to at least one email follow-up. Half (50%, n = 13) redeemed their helmet voucher, 13 (50%) replied at 2-week f/u, 9 (34.6%) at 2-month f/u, 10 (38.5%) at 6-month f/u, and 8 (30.8%) at one year f/u. Fewer controls (n = 9/46, 19.6%) responded at one year. At one year f/u most (6/8, 75%) HEADSTRONG respondents reported always wearing a helmet, compared with few (2/9, 22.2%) of respondent controls.
Conclusion: Unhelmeted injured cyclists were frequent commuter cyclists who chose not to wear helmets for reasons largely related to convenience. Limitations include sample size, single site, and limited follow-up. Interventions employing principles of adult education and behavioral economics may be effective to achieve sustained helmet use in adult cyclists, warranting larger studies.
Keywords: head injury, bicycle helmet, injury prevention

PO075

Perspectives on a tool to evaluate emergency department note quality: a modified Delphi approach

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Innovation Concept: Good documentation is an essential component of high-quality patient care. Deficient documentation can potentially result in poor patient outcomes due to breakdowns in communication with patients, families, and team members. Despite the importance of high-quality documentation, Emergency Medicine (EM) residents receive little formal training on appropriate emergency department (ED) documentation. Previous work highlights residents' desire for formal training in ED documentation best practices to become more proficient. This discordance suggests a gap in education and an opportunity for improvement. To teach best practices, an accepted standard for a high-quality ED note is required. Unfortunately, tools to assess ED note quality are lacking. The QNOTE and PDQI-9 were developed to evaluate note quality, but have not been validated for ED documentation, and in some cases have performed poorly. As such, our objective is to develop a tool capable of assessing the quality of ED notes for Canadian Triage Acuity Scale (CTAS) 2-5 visits in patients $\geq$ 16 years of age.
Methods: Our study employs a modified Delphi design. Leveraging the team's network through a purposive sampling approach, we are inviting 30-35 EM attending and senior resident physicians to participate as expert panelists. This group will encompass a broad range of practice locations and professional backgrounds. We aim to run two to three Delphi rounds, with completion factors determined *a priori*. We first seek to gather the perspectives of experts on the content domains, attributes, and scoring systems relevant to ED note quality assessment. We will then integrate these dimensions into a tool and present them to experts for review during a second round. A third round may be used to achieve consensus and finalize the tool.
Curriculum, Tool or Material: The ultimate outcome of this project is to develop a tool capable of assessing note quality for a variety of ED presentations. This then sets the stage for validation of the tool locally. Once validated, EM residents will have access to a set of defined criteria which will be recognized as being essential for a high-quality ED note. We foresee the tool being used by trainees to objectively improve ED documentation and by faculty to give more targeted feedback to learners.
Conclusion: We aim to complete physician recruitment and Delphi rounds by spring 2023, with the finalized tool expected summer 2023. Once finalized, we anticipate our tool will have broad applicability to EM medical education in Canada.
Keywords: innovations in emergency medicine education, documentation quality, Delphi method

PO076

Comparative effectiveness of ketorolac dosing strategies for emergency department patients with acute pain – a systematic review and meta-analysis of randomized controlled trials

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Introduction: Ketorolac is a commonly used non-opioid, parenteral analgesic for the treatment of Emergency Department (ED) patients with acute pain. However, despite several randomized controlled trials (RCTs), the optimal dosing strategy of ketorolac is uncertain. We conducted a systematic review and meta analysis of different ketoralac dosing strategies for acute pain in the ED.
Methods: We searched MEDLINE, PubMed EMBASE, and unpublished sources from inception through December 9, 2022. We included RCTs of patients presenting with acute pain to the ED, comparing ketorolac doses less than 30mg (low dose) to ketorolac doses greater than or equal to 30mg (high dose). Reviewers screened abstracts, full texts, and extracted data independently and in duplicate. We pooled data using a random-effects model, and assessed risk of bias of included studies using the Cochrane tool. We assessed certainty of evidence using the Grading Recommendations Assessment, Development and Evaluation (GRADE) approach and communicated results using the GRADE informative statements framework. We preregistered the protocol on PROSPERO (CRD42022310062).
Results: We included 5 RCTs (n = 627 patients). All studies excluded pediatric patients less than 18 years old, and adult patients at higher risk for adverse events. Compared to high dose parenteral ketorolac ($\geq$ 30mg), low dose ketorolac at 15 to 20mg probably has no effect on pain scores (Mean Difference [MD] 0.05 mm lower on 100mm visual analog scale [VAS], 95% Confidence Interval [CI] − 4.91 mm to +5.01 mm higher; moderate certainty). Further, low dose ketorolac at 10mg may have no effect on pain scores compared to high dose ketorolac (MD 1.58 mm lower on 100mm VAS, 95% CI − 8.86 mm to 5.71 mm; low certainty). Low dose ketorolac may increase the need for rescue analgesia (Risk Ratio [RR] 1.27, 95% CI 0.86 to 1.87; low certainty) and may have no difference on rates of adverse events (RR 0.84, 95% CI 0.54 to 1.33; low certainty).
Conclusion: In adult ED patients with acute pain, parenteral ketorolac given at doses of 10mg to 20mg is probably as effective in relieving pain as doses of 30mg or higher, suggesting a ceiling analgesic effect to ketorolac. Low dose ketorolac may have no effect on adverse events but these patients may require more rescue analgesia compared to high dose ketorolac. This evidence is limited by imprecision and is not generalizable to children, or adult patients at higher risk of adverse events.
Keywords: ketorolac, drug dosing, systematic review

PO077

Initial rapid biochemical markers as predictors of morbidity and mortality in undifferentiated emergency department hypotensive patients - a multicentre study

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Introduction: Patients presenting to the emergency department (ED) with shock are at high risk of poor outcomes. Rapid biochemical markers have been used in risk stratification in inpatient settings; we wanted to explore if initial rapid biomarkers can predict ICU admission and death in undifferentiated hypotensive ED patients.
Methods: In this secondary analysis of prospectively collected data from the SHoC-ED database, we investigated the predictive ability of initial pH, pO2, pCO2, HCO3, and lactate for ICU admission or 7-day mortality in undifferentiated hypotensive patients presenting to the ED. 269 patients at six sites (three North American, three South African) were included for univariate logistic regression with 10x cross validation. Contingency tables were used to determine diagnostic test performance for a composite variable comprising ICU admission and mortality.
Results: Blood gas pH, pO2, pCO2, HCO3 did not have clinically reliable diagnostic performance characteristics. The least reliable sensitivity (9%), specificity (71%), and positive likelihood ratio (0.34) belonged to low pO2. The lowest positive (0.05) and negative (0.58) predictive values came from high and low pCO2, respectively. The lowest negative likelihood ratio (0.66) came from a high pO2. The most reliable biomarker was raised lactate with a sensitivity of 39%, specificity of 76%, positive predictive value of 0.759, negative predictive value of 0.65, positive likelihood ratio of 3.47, and a negative likelihood ratio of 0.69. The only biomarkers deemed significantly ($p < 0.05$) associated with ICU admission were pH (Coeff: -7.04), HCO3 (-0.13), and lactate (0.28). All traditional venous blood gas biomarkers were significantly associated with mortality: pH (-3.47), pO2 (0.02), pCO2 (-0.06), HCO3 (-0.12), and lactate (0.31).
Conclusion: A raised serum lactate had a high specificity for prediction of ICU admission or death in undifferentiated hypotensive ED patients. Other rapid venous blood gas biomarkers were poorly sensitive or specific predictors. In logistic regression modeling, pH had a strong negative association with both ICU admission and mortality and may therefore be worth more investigation.
Keywords: biomarkers, shock, risk stratification

PO078

Dispensing sterile injection supplies to emergency department patients who inject drugs: a quality improvement project in patient safety

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Background and Aim Statement: People who inject drugs are at an elevated risk of contracting blood borne diseases, presenting to an emergency department (ED), and requiring hospitalization. These risks are higher in those that share injection and preparation equipment. Using sterile injection and preparation supplies is an evidence-based harm reduction strategy that addresses these risks, and was identified as 'essential care' by the Canadian Association of Emergency Physicians (CAEP) 2020 position statement on ED Management of Opioid Use Disorder.
In many Canadian cities, there are established programs for distribution of sterile injection supplies, however, many EDs are not in close proximity to these sites. Proximity is important, as patients often leave the ED in opioid withdrawal, placing them at risk of using non-sterile supplies. This project addresses the issue by providing the Vancouver General Hospital (VGH) ED with sterile injection supplies for distribution to adult patients who inject drugs at their time of discharge. We expect that this will decrease the risk of disease transmission, empower healthcare providers to engage with their patients regarding harm reduction, and improve provider-patient relationships.
Measures and Design: Kit materials are provided by the BC Centre for Disease Control and stored in patient care areas of the ED. Any adult patient who injects drugs is eligible and can be identified by any member of their care team. No record of patient identification is required to dispense a kit.
There are two outcome measures of this study: the number of kits dispensed, and the healthcare provider experience. We are in the process of distributing a formal survey to elicit feedback to identify perceived challenges or unanticipated negative impacts.
Evaluation/results: Since project initiation, over 250 kits have been dispensed. The response to this project has been positive, with informal feedback from staff thus far reporting improved patient relationships and increased confidence in patient safety following discharge.
Discussion/impact: This project addresses the CAEP statement on ED Management of Opioid Use Disorder that calls for prevention of 'future morbidity and mortality resulting from opioid use', by providing patients with sterile injection supplies. We infer that this has expanded harm reduction practices in our ED, and improved provider-patient relationships. Given the success of this initiative we plan to expand to other EDs in Vancouver and provide an examplefor further expansion to EDs across the country.
Keywords: quality improvement and patient safety, harm reduction, substance use

PO079

An evidence synthesis of delirium clinical practice guidelines relevant to the care of older adults in the emergency department

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Introduction: Older adults are at high-risk of developing delirium in the emergency department (ED). However, it often goes undetected or undertreated. Improving ED delirium care has been challenging, partly due to a lack of standards to guide best practice in this setting. Clinical practice guidelines (CPGs) have the power to translate scientific evidence into recommendations to improve practice. This study aimed to critically appraise and synthesize delirium CPG recommendations and identify those relevant to older ED patients.
Methods: We conducted a multi-phase umbrella review to retrieve relevant CPGs (including Scopus [Medline and Embase], EBSCOhost [CINAHL, AgeLine, and Academic Search Complete], Guidelines International Network library, ECRI Guideline Trust®, and Google Advanced). Quality of the CPGs and their recommendations were critically appraised using the Appraisal of Guidelines, Research, and Evaluation (AGREE)-II; and Appraisal of Guidelines Research and Evaluation – Recommendations Excellence (AGREE-REX) instruments, respectively. A threshold of 70% or greater in the AGREE-II Rigour of Development domain was used to define high-quality CPGs. Delirium recommendations from CPGs meeting this threshold were included in the synthesis and narrative analysis. To define an acceptable level of interrater reliability (IRR), a Cohen's kappa of

0.60 was used for the screening phase, and an interclass correlation coefficient (ICC) of 0.50 was used for the critical appraisal phase.
Results: During the two-part screening phase, IRR was substantial ($k = 0.79$) and near perfect ($k = 1.00$). Ten CPGs were included in our review. Critical appraisals had good IRR (ICC $= 0.76$). Five CPGs met the pre-defined quality threshold, with AGREE-II Rigour of Development scores ranging from 37% to 83%. The five CPGs appraised using AGREE-REX all scored well for items 'Evidence' (median, 6; IQR, 2) and 'Applicability to Target Users' (median, 6; IQR, 0). The lowest scores were for the item 'Values and Preferences of CPG Developers' (median, 4; IQR, 1). Included recommendations ($n = 75$) were grouped into four categories: screening, diagnosis, risk reduction, and management. Areas of agreement and disagreement across CPGs were highlighted.
Conclusion: This is the first known review of delirium CPGs including a critical appraisal and synthesis of recommendations, with a focus on older ED patients. Stakeholders can use this synthesis to inform future improvement efforts and research in the ED.
Keywords: delirium, older adults, practice guideline

PO080

Prescribing cellular phones in the emergency department to address digital health inequities and improve access to healthcare

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Introduction: Telehealth has led to increasing health inequities for patients without phones who have difficulty accessing follow-up care. The emergency department (ED) is often these patients' only touchpoint for healthcare, making the ED an ideal place to pilot an intervention. Healthcare providers in St. Michael's Hospital (SMH) and University Health Network (UHN) EDs distribute prepaid cellular phones to address this unmet need. Our study aims to assess how ED-based distribution of phones affects contact with the healthcare system.
Methods: This multicentre study was conducted as a retrospective chart review with inclusion criteria of > 18 years old and no phone at time of index ED visit. Outcome measures include changes to the frequency or type of ED visits, as well as changes in quantity and attendance of clinic or follow-up appointments after intervention. A total of 315 patient charts were reviewed (68 from SMH, 247 from UHN), with a date range of November 2019 to May 2022. At SMH, some participants ($n = 24$) were assigned outreach workers who provided ongoing case management. Descriptive statistics were used to analyze patient demographics, number of ED visits, follow-ups, and clinic appointments.
Results: About 50% of phone recipients had no fixed address and nearly 30% relied on shelters for temporary housing. 52% of participants took prescription medication for chronic conditions, requiring frequent visits to pharmacies and repeated prescription refills. On average, participants had 3 comorbidities. Preliminary results demonstrate a 75.9% increase in clinic visits post-intervention at UHN, and a comparative reduction in ED visits post-intervention for patients who were seen at SMH. Patients seen at SMH had an average reduction of 1 ED visit/90 days post-intervention.
Conclusion: Participants were medically and socially complex, warranting a comprehensive intervention that enhanced their access to healthcare. Distribution of prepaid phones significantly increased the number of clinic appointments for those who required specialist care. We hypothesize that the decrease in ED visits post-intervention at SMH is due to the effect of the intervention combined with access to intensive case management. Qualitative data collected from patient interviews and healthcare provider surveys confirmed the value that the intervention has on improving patients' access to healthcare. Further data analysis is anticipated to elucidate the effects of this intervention.
Keywords: digital health equity, intervention, healthcare access

PO081

Team cognition in paramedicine: qualitative interviews exploring strategies to maintain shared representations in acute care teams

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Introduction: Shared cognition among team members can powerfully influence clinical outcomes in emergency teams and pertains to both the 'state' of being on the same page (e.g., shared situational awareness) as well as the actions that enable this state (e.g., information sharing; Mohammed et al., 2021). Team cognition research in emergency medicine remains an emerging field, and Evans et al., (2021) pinpointed gaps including inconsistent operationalization and infrequent application of these constructs in clinical practice. The goal of the current study was to explore team experiences within an Ontario paramedic service, with a focus on aligning team cognition constructs alongside experiences of healthcare providers.
Methods: Semi-structured interviews were conducted with 11 staff spanning clinical and education-related roles (i.e., 9 paramedics; 2 physicians). Video and phone-based interviews garnered reflections on what constitutes a 'team', sharing optimal team experiences, and strategies to improve teamwork. A critical realist approach was adopted, where participants' experiences were acknowledged to be relative and unique, but still informative for understanding conventional team processes. The research team used reflexive thematic analysis with transcribed interviews to form a context-specific definition for team cognition and identify core themes.
Results: Participants identified team cognition as a defining feature of teamwork that was particularly evident when describing high-acuity, novel, or adverse circumstances – situations that threaten shared representation. Key experiences involved establishing shared mental models during briefing, maintaining ongoing situational awareness during call progression, and updating mental models to adjust for novel situations. Core themes include: (a) Navigating familiarity (i.e., familiar vs ad hoc teams), (b) Training and preparation (i.e., organizational norms vs interprofessional idiosyncrasies), and (c) Boundary-spanning (i.e., paramedic teamwork vs working with other professions or organizations).
Conclusion: These findings emphasize how team cognition can be a defining feature of team performance in paramedicine, and illustrate how concepts like mental models overlap with the lived experiences of paramedics and physicians. This research also supports approaches to discuss team cognition during training and simulation as well as strategies to overcome threats to shared representation in paramedicine.
Keywords: paramedicine, teamwork, team cognition

PO082

Utility of pelvic binder application in the prehospital setting: a systematic review

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Introduction: Pelvic binders (PB), also known as pelvic circumferential compression devices, are used in the prehospital setting to immobilize suspected pelvic fractures to reduce significant hemorrhage. Despite this, a lack of data exists on the prehospital use of PB. This study aims to review the current evidence surrounding commercial and non-commercial PB application in the prehospital trauma setting.
Methods: We searched MEDLINE and EMBASE from inception to September 6th, 2022, using a structured search strategy around keywords "Trauma," "Binder," and "Pelvic." Studies were included if they had an English abstract and examined the use of PB to treat suspected pelvic fractures in the prehospital setting. Two reviewers independently screened articles for inclusion and performed data extraction using a pre-determined form. Risk of bias was assessed using standardized tools for each type of included study. No meta-analyses was performed based on significant heterogeneity between studies and high risk of bias.
Results: Our search identified a total of 1725 studies. Of these 13 studies met our inclusion criteria and were included. These studies included 4 retrospective cohort studies, 2 prospective cohort studies, 1 prospective clinical trial, 1 randomized crossover trial, and 5 case reports. All studies were evaluated as moderate to critical risk of bias. There were a total of 1409 patients among the 13 included studies, 554 (39%) had a PB placed in the prehospital trauma setting for a pelvic fracture. The type of PB used was not reported in the majority (9/13, 69%) of the studies. A SAM splint was most used and reported in 175 cases (32%) and TPOD was used in 24 (4%). Three studies reported on associations with patient outcomes, describing no difference in patient outcomes with PB use. PB placement was reported in 2/13 studies (15%), of which 87 (16%) were placed correctly.
Conclusion: The evidence for the use of PB in the prehospital setting for the stabilization of pelvic fractures is limited, with significant risk of bias. Current evidence suggests that PB are often placed incorrectly. Further research is needed to investigate the optimal use of these devices for prehospital trauma patients.
Keywords: prehospital, trauma, binders

PO083

Examining code white activations in the emergency department

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Introduction: Violence in the Emergency Department (ED) is increasing, putting patients and health care providers at risk of harm. A code white is an emergency response to a threatening or violent situation and often involves the activation of security officers. Our objective was to describe patient characteristics, interventions including the use of pharmacologic and physical restraints and injuries associated with ED code white activations.
Methods: This was a health records review at two sites of an academic hospital between 12/2019 and 06/2020. We included all non-admitted ED patients $\geq$ 18 years of age requiring a code white activation. Cases were identified through a security database with data extracted from the electronic medical record and the security database. Outcome measures included: use of restraints and healthcare physical assault. Data were reported using descriptive statistics.
Results: During the study time frame, there were 503 code white activations involving patients with mean age of 42 years and 68.7% male. Most patients, 318 (63.2%) had a history of violence (physical and/or verbal) documented in their chart, 326 (64.8%) and 267 (53.1%) patients had known mental health and polysubstance use disorders, respectively. Safety concern (42.9%) was the most common reason for code white activation, followed by physical violence (32.2%), agitation (27.6%), and verbal violence (26.6%). Of the 503 cases reviewed, 458 (91.1%) patients were physically restrained with a combination of hard (82.9%), soft (8.6%) and handcuff (6.8%) restraints. Pharmacologic sedation was administered to 335 (66.5%) patients. Physical restraints and pharmacologic sedation were used in 310 patients (61.6%). The most frequently used medication was lorazepam (67.5%), followed by haloperidol (53.1%) and midazolam (23.6%). Documented physical assaults and near misses to healthcare personnel occurred 11.3% and 14.9% respectively. Physical assault included: punching (22%), spitting (31.5%), kicking (16.67%), and biting (9.30%). More than half of assault cases (56.1%) were not reported on hospital records compared to security event log (89.5%).
Conclusion: Patients with a code white activation had a high proportion of mental health disorders, polysubstance use and previous history of violence. De-escalation was successful less than ten percent of the time. Physical assault of healthcare personnel was poorly documented. This information can be used to inform policy and education regarding ED code white activations.
Keyword: workplace violence

PO084

Association of air quality during forest fire season with respiratory emergency department visits in Vancouver, British Columbia

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Introduction: Climate change has been deemed the biggest global health threat of the 21st century. One consequence of climate change is the increasing frequency and severity of forest fires. Smoke from wildfires has the ability to negatively impact air quality over large distances. The aim of this study was to examine the effect that air quality had on emergency department visits for cardiac, respiratory and psychiatric chief complaints during forest fire season in Vancouver, British Columbia.
Methods: The study period was January 1 – December 31, 2019. Forest fire season was defined as April 1- September 30. Air quality (measured by PM2.5 in ug/m^3) was obtained from the Vancouver International Airport (YVR) Air Quality station. Emergency department visit data (CEDIS triage complaint) was acquired from a regional emergency department database. A generalized linear mixed model with Poisson link function was used to determine the relative risk (as a percentage) for respiratory, cardiac and psychiatric CEDIS triage complaints associated with a 10 unit increase in PM2.5.
Results: PM2.5 during forest fire season was significantly associated with emergency department visits for respiratory chief complaints. For every 10 ug/m^3 increase in PM2.5, there was a 4.61% (95% CI: 3.07, 6.17) increase in relative risk of respiratory chief complaints presenting to emergency departments. No association was found between PM2.5 and cardiac or psychiatric chief complaints during forest fire season or non-forest fire season. During non-forest fire season, PM2.5 was found to be negatively associated with respiratory (− 3.57, 95% CI: − 5.44, − 1.66) and cardiac chief complaints (-2.77, 95% CI: − 4.16, − 1.47).
Conclusion: Our results indicate a probable association between air quality during forest fire season and emergency department visits for respiratory chief complaints. This provides further illustration of the widespread impact of climate change, and underscores the importance of efforts to address it.
Keywords: forest fires, climate change

PO085

A cohort study: an examination of high emergency department utilization among Ontarians who have a history of homelessness

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Introduction: Individuals with a history of homelessness often experience frequent use of emergency departments (ED) due to limited access to other services and large deterioration of their health. However, the impact of the pandemic on high use of the ED has not been explored. The purpose of the study was to examine the patient characteristics and healthcare utilization patterns among Ontarians who have a history of homelessness and experienced high use of the emergency department during the first year of the pandemic.
Methods: Analysis was conducted on a population of individuals from the former Hamilton Niagara Haldimand Brant Local Health Integration Network (HNHB LHIN, population $= \sim 1.4$ million) with frequent visits defined as 5+ visits to the ED per year. Using Integrated Decision Support (IDS), data were abstracted from the National Ambulatory Care Reporting System (NACRS), Client Health and Related Information System (CHRIS), Discharge Abstract Database (DAD) and Ontario Mental Health Reporting System (OMHRS) on patient demographics, arrival by ambulance, frequency of visits and diagnostic category for the 2020/2021 fiscal year.
Results: 1,135 individuals with a history of homelessness had high ED use, encompassing a total of 13,818 ED visits. Of this population, 70.22% were male and the majority of these individuals (57.01%) were between the ages of 25–35 (31.72%) and 35–45 (25.29%). 62% ($n = 705$) of individuals also had high ED use during a previous year. During the year studied, 67% ($n = 755$) of this population had at least 1 hospitalization with an average of THREE hospitalizations (SD: 2.84, median: 2, IQR: 3) per person. Moreover, these individuals exhibited high use of ambulances to the ED with 1,043 of studied individuals arriving by ambulance a total of 7476 times. The mean number of arrivals by ambulance was 7.17 (SD: 13.36, median: 4, IQR: 5). The most common diagnosis categories for these individuals were injury, poisoning and substance abuse (21.93%), mental and behavioural disorders (15.35%) and skin diseases (14.04%).
Conclusion: The population of individuals with a history of homelessness make frequent visits to the ED and a large portion require the usage of ambulance services. The results show that majority of these individuals present with mental health or substance abuse diagnoses. These characteristics can be used by policymakers to target specific programs and services in the community, as well as to enhance the quality of ED services.
Keywords: emergency department, homelessness, high frequency user

PO086

Identifying outlier assessors using workplace based assessments – a novel, simple method

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Introduction: Assessor variability has long been acknowledged as a threat to the reliability and validity of workplace-based assessments (WBAs). In particular, assessor stringency/leniency (ASL) can a have disproportionate impact on assessment scores, and this effect has been shown to persist even when averaged over several assessors. To date, there is no published method for identifying outlier assessors in the setting of WBAs.
Methods: We propose a simple, three-step method for identifying outlier stringent or lenient assessors. First, an expected score is determined for each learner. Second, for each assessor, the difference between the score they award a given learner and that learner's expected score is calculated. The average of these differences, over all learners assessed by a given assessor, is termed the assessor's "mean delta". Finally, assessor mean delta values are compared to those of the rest of the assessor cohort, and those above a pre-determined threshold are identified as outliers.
We apply this method to identify outlier assessors in a typical WBA data set and quantify the cumulative effect of ASL on overall learner scores.
Results: A total of 3851 assessments, completed by 77 assessors, were analysed. Using cut-off values of 1.5 and 2 standard deviations, a total of 11 and 3 outlier assessors were identified respectively (7 vs 1 stringent outliers, and 4 vs 2 lenient outliers). Moreover, the cumulative effect ASL persisted despite learners having multiple assessors, and was larger in magnitude than the average difference between learners of different years for 1 in 8 learners.
Conclusion: We propose a simple method for identifying outlier stringent and lenient assessors in the setting of WBAs. This method could be used to identify assessors who may benefit most from targeted coaching and feedback and may be used to measure changes in assessors' tendencies over time or with specific interventions.
Keywords: assessor stringency/leniency, Hawk and dove effect, outlier assessors

PO087

Success of amoxicillin oral challenges in children at low risk of allergy requiring antibiotic in the emergency department

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Introduction: Up to 10% of children are labelled as penicillin allergic, requiring the use of suboptimal antibiotics as an alternative. A low-risk oral challenge with amoxicillin can be done to evaluate the accuracy of this allergy. An oral challenge pre-written order was implemented in our institution's emergency department (ED). The aim of this study was to assess the success of the oral amoxicillin challenges.
Methods: This is an ongoing prospective observational study conducted at a tertiary care pediatric hospital. Children considered at low risk of penicillin allergy (https://www.inesss.qc.ca) and requiring amoxicillin according to the ED physician were prescribed an amoxicillin challenge on a pre-written order set. In the absence of a reaction, patients were discharged with an amoxicillin prescription. Parents were contacted one month after the challenge to assess for late onset reactions.
Results: Since June 2021, 70 children (24 female) underwent an amoxicillin challenge in the ED. The patients' median age was 1 yo (6 mo–12 yo). The most frequent discharge diagnoses in the ED were otitis media (65%) and pneumonia (24%). The challenge was successful in the ED for 69/70 (99%) patients. Sixty-two (89%) patients were successfully contacted for a follow up phone call. Among them, 55/62 (89%) did not present any reaction. In total, 7/62 (11%) of the children had a reported reaction: one (1%) child had an immediate reaction in the ED, while 6/62 (10%) had a rash 1 to 61 days after the first dose of antibiotics. No severe reactions were reported after discharge. A correlation between the amoxicillin administration and the delayed reaction was considered less likely for 3/6 patients because of

the later onset of symptoms (28–61 days). The three other patients were considered not to have a penicillin allergy after formal assessment at the allergy clinic.
Conclusion: Using a standardized pre-written order set for an amoxicillin challenge in the ED allowed 99% of participating children to be discharged safely with an amoxicillin prescription. Despite about 10% of the children presenting a rash after discharge, none were considered to have a late onset reaction after follow-up. Such a protocol provides the opportunity to safely and rapidly remove the label of "penicillin allergy" from pediatric ED patients, allowing them to be treated with optimal first-line antibiotics for common pediatric infections. It also eliminates the need for a consultation with an allergist in the majority of patients.
Keywords: penicillin allergy, oral challenge, pediatric

PO088

Infant malrotation with midgut volvulus presenting in the pediatric emergency department or the neonatal intensive care unit: a retrospective review for a quality improvement initiative

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Introduction: In neonates, bilious vomiting is considered malrotation with midgut volvulus (MV) until proven otherwise, given its associated high morbidity/mortality. The diagnosis is time-critical, requiring prompt identification to avoid complications. Many of these patients are described clinically well at time of presentation, possibly delaying definitive management. This study was a retrospective quality initiative aimed to evaluate the clinical presentation of children with MV in a single pediatric tertiary care center Emergency Department (ED) and neonatal intensive care unit (NICU) to identify delays in the management pathway.
Methods: Patients with a final diagnosis of MV presenting to the ED/NICU were identified between Jan 2015 and Aug 2022. Patient demographics, clinical presentation, initial laboratories, imaging, and surgical findings were recorded. The following time points were recorded: (1) first medical evaluation, (2) radiologic investigations [abdominal X-ray (AXR), ultrasound (US), upper gastrointestinal radiography (UGI)], (3) consultation with surgical team and (4) time to surgery.
Results: During the study period, 30 children presented a diagnosis of MV (ED: 22, NICU: 8). The median age was 7 days (3–13), with 28/30 (93%) being less than 3 months and 21 patients (70%) were male. Bilious green (14/27), yellow-green (4/27) or yellow (9/27) vomiting was the most frequent presentation in 27/27 (100%) (3 patients with missing data). Five (17%) had a pH < 7.30 (base deficit < -5) and seven (24%) had a glucose value > 7 mmol/L. AXR was performed in 17/30 (57%) patients. All (100%) had US which was diagnostic in 24/30 (80%) cases. Seven UGI were performed, being diagnostic in all cases (100%). The Ladd's procedure was the standard treatment for all (100%). Median time between arrival and US was 146 min (62–234), UGI was 316 min (216–771) and surgery was 297 min (206–368). 13 cases were referrals (43%), with the median time between the first documented bilious vomit and the call from the referral center being 356 minutes (134-808). Of the 30 cases, 28 (93%) survived and two suffered a short bowel complication.
Conclusion: Bilious (green/yellow) vomiting is a reliable clinical sign of MV in infant, being aware that yellow can be bile. Ultrasound is a rapid test with about 80% diagnostic accuracy. Delay for definitive surgery was considered slightly high. This quality initiative will help develop a clinical practice guideline and algorithm to reduce delays for infant presenting with MV.
Keywords: midgut volvulus, infant, quality improvement

PO089

Influence de la pandémie COVID-19 sur la qualité des manoeuvres de réanimation préhospitalière: une étude de cohorte pancanadienne

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Introduction: High-quality cardiopulmonary resuscitation (CPR) is associated with improved outcomes for out-of-hospital cardiac arrest (OHCA). Measures adopted to decrease the occupational risk of COVID-19 transmission (e.g., use of additional PPE, decreased use of endotracheal intubation) may have impacted CPR quality. We examined the association between the COVID-19 pandemic and CPR quality provided by emergency medical service (EMS) personnel.
Methods: We examined prospectively collected registry data of the Canadian Resuscitation Outcomes Consortium (2019–2021), which includes non-traumatic OHCA. We excluded cases: with age < 18 years, not treated by EMS, with return of spontaneous circulation (ROSC) before EMS arrival, and missing CPR quality data. The primary outcome was meeting all *Heart and Stroke Foundation of Canada* (HSFC) guidelines for high quality CPR (mean chest compression fraction $> 80\%$, mean chest compression rate 100–120/min, mean chest compression depth 50–60 mm and mean pre-shock pause < 10 s) over the first 10 minutes of resuscitation (or until ROSC, if present). We fit univariate and logistic regression models to test the association between measures adopted within the COVID-era (March 2020–December 2021), with reference to pre-COVID, and the primary outcome. The final model was adjusted for age, sex, public vs private location, witnessed arrest or not, bystander CPR or not, bystander defibrillator, automated external defibrillator used by a bystander, EMS response time and time to CPR.
Results: Of 56,885 EMS-assessed OHCAs, we included 2390. Baseline characteristics were similar in the pre-COVID ($n = 371$) and COVID-era ($n = 2019$) groups (median age: 68 [interquartile range 55–79] vs 69 years [interquartile range 54–80]; male: 61% vs 66%, respectively). 56% of patients in the pre-COVID era received CPR which met all HSFC CPR guidelines, as compared to 48% of patients in the COVID era. In our univariate model, patients treated in the COVID-era were less likely to receive high-quality CPR (odds ratio [OR]: 0.74 [95% CI 0.56–0.98]). However, this association did not persist in the multivariable model (adjusted OR: 0.84 [95% CI 0.60–1.20]).
Conclusion: We did not observe an independent association between measures adopted during the COVID-19 pandemic and the overall CPR quality. Future studies should explore if patients' outcomes were influenced by these measures.
Keywords: out-of-hospital cardiac arrest, COVID-19, cardiopulmonary resuscitation quality

PO090

Quality of health economic evaluations in emergency medicine journals: a systematic review

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Introduction: Health economic evaluations are used in decision making regarding resource allocation and it is imperative that they are completed with rigor. The primary objectives were to describe the characteristics and assess the quality of economic evaluations published in the emergency medicine (EM) literature.
Methods: Two reviewers independently searched 19 EM-specific journals via Medline and Embase from inception until March 3, 2022. Quality assessment was completed using the Quality of Health Economic Studies (QHES) tool and the primary outcome was the QHES score out of 100. Additionally, we identified factors that may contribute to higher quality publications.
Results: 7260 unique articles yielded 48 economic evaluations that met inclusion criteria. Most studies were cost-utility analyses and of high quality, with a median QHES score of 84 (interquartile range, IQR: 72,90). Studies based on mathematical models and those primarily designed as an economic evaluation were associated with higher quality scores. The most commonly missed QHES items were: i) providing and justifying the perspective of the analysis, ii) providing justification for the primary outcome, and iii) selecting an outcome that was long enough to allow for relevant events to occur.
Conclusion: The majority of health economic evaluations in the EM literature are cost-utility analyses and are of high quality. Decision analytic models and studies primarily designed as economic analyses were positively correlated with higher quality. To improve study quality, future EM economic evaluations should justify the choice of the perspective of the analysis and the selection of the primary outcome.
Keywords: health economics, quality analysis

PO091

Neighbourhood marginalization as a social determinant of health for SARS-CoV-2 outcomes in Canadian emergency departments: a health records review

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Introduction: Social determinants of health have been associated with differential outcomes in patients with Coronavirus Disease 2019 (COVID-19). Our objective was to describe the relationship between neighbourhood marginalization and COVID-19 outcomes among patients presenting to Canadian emergency departments (ED).
Methods: This health record review included patients who presented to one of 47 EDs participating in the Canadian COVID-19 ED Rapid Response Network (CCEDRRN) between March 3, 2020 and July 24, 2022. We included patients testing positive for COVID-19, and excluded patients from out-of-province, living in institutions, and from areas with incomplete census enumeration. We linked CCEDRRN data to the Canadian Marginalization Index (CAN-Marg) using the forward sortation areas of patients' postal code of residence. The CAN-Marg index defines quintiles of marginalization using census indicators in four dimensions: households/dwellings, material resources, age/labour force, and immigration/visible minority. Our primary outcome was in-hospital mortality. Secondary outcomes were (1) disease severity, (2) intensive care unit (ICU) admission and (3) ICU admission duration. Numerical summaries described data by CAN-Marg dimension.
Results: We analyzed data from 55,683 eligible patients with 60,188 ED visits of which 95 patients (99 ED visits) were excluded. Their mean age was 52 (95% CI 52–53) years, 49% (95% CI 49–50) were female and 50% (95% CI 49–50) were unvaccinated for COVID-19. Many patients lived in a neighbourhood assigned the most deprived quintile in ≥ 1 dimension: 36% (95% CI 36–37) in household dwellings, 21% (95% CI 20–21) for material resource, 7% (95% CI 7–8) for age/labour force, and 46% (95% CI 45–46) immigration/visible minority. Patients living in the most materially deprived neighbourhoods had higher in-hospital mortality rate (14% (95% CI 13–15) vs. 12% (95% CI 11–13)), more severe disease (28% (95% CI 27–28) vs. 26% (95% CI 25–27)), more ICU admissions (4% (95% CI 3–4) vs. 3% (95% CI 2–3)) and longer mean ICU length of stay (25 days (95% CI 21–29) vs. 21 days (95% CI 18–23)) compared to those living in the least deprived neighbourhoods.
Conclusion: Neighbourhood deprivation negatively impacted patients infected with COVID-19 who presented to Canadian EDs. The most marginalized had worse outcomes than those least marginalized. Future research is needed to understand why outcomes are worse, and what factors can be mitigated for improvement.
Keywords: coronavirus disease, marginalization, emergency medicine

PO092

Introducing the O-SCORE and workplace-based assessment in emergency medicine clerkship rotation

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Innovation Concept: At the University of Ottawa (uOttawa), curriculum renewal efforts within UGME aim to adopt EPAs as part of a shift towards CBME by 2024. In preparation for this transformative change, the emergency medicine (EM) clerkship rotation introduced the Ottawa Surgical Competency Operating Room Evaluation (O-SCORE) Scale and select EPAs to the Supervised Teaching Shift.
Methods: The EM rotation implemented a formative workplace-based assessment (WBA) using O-SCORE (1 = "I had to do" to 5 = "I did not need to be there") during the Supervised Teaching Shift, a dedicated shift where 5 clerks are assigned to an emergency physician without clinical duty that allows learners to perform direct observation in the department. Preceptors completed the pre-existing mini-Clinical Evaluation Exercise (mini-CEX) and O-SCORE scales. This is in addition to the shift assessment cards that preceptors complete at the end of each shift. Correlations among O-SCORE levels, shift assessment scores, and mini-CEX levels will be examined. Generalizability theory will be used to assess reliability. Evaluation is based on the RUFDATA framework with survey and focus groups data gathered and qualitatively analyzed inductively.
Curriculum, Tool or Material: This pilot is the first step towards CBME in clerkship at uOttawa. While direct observations of performance are the foundation of EPAs, they are challenging to operationalize in the high flow, high pressure emergency department. By concentrating direct observations on Supervised Teaching Shifts, a dedicated shift where 5 clerks are assigned to an emergency physician without clinical duty, patient flow and care are unchanged. This educational innovation allows competency to be formally assessed with feedback facilitated by the O-SCORE. Familiarizing students to the CBME framework further prepares them for residency. Underpinning theories, including institutional logics, provide framework of program evaluation. Post-intervention survey and focus group provide qualitative data that are examined through reflexive thematic analysis.
Conclusion: The peri-pandemic era is that of change, nestled in the greater context of UGME shifting towards CBME. While this project highlights feasibility of implementing WBA, there are challenges,

including faculty development and operational process of requesting/completing WBAs. Iterative program evaluation is ongoing.
Keywords: entrustable professional activities (EPAs), undergraduate medical education (UGME)

PO093

Examining mentorship from the perspective of emergency medicine near-peer resident-mentors

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Innovation Concept: In 2021, the University of Ottawa Department of Emergency Medicine (DEM) implemented a near-peer support program matching junior resident-mentors to student-mentees. While the benefit of engaging in mentoring relationship for the mentee is apparent, this educational intervention uncovered overarching benefits to emergency resident mentors. This study set out to explore residents' perceptions of the near-peer program, with findings showing benefits of being a resident-mentor, highlighting a future avenue of educational support for emergency residents.
Methods: 7 resident-mentors participated in the program. 5 resident-mentors participated in semistructured interviews to discuss their experiences of being a mentor and their perceptions of the near-peer project, the COVID19 pandemic and wellness initiatives. Themes were generated using constant comparative analysis and reflexive thematic analysis.
Curriculum, Tool or Material: This program is tailored to the Ottawa EM community's particular learning environment with an emphasis on early engagement. Students ranked their top 3 choices of mentors in a self-match process, which was chosen over coordinator-match process to enhance intrinsic motivation. 14 students were chosen through a random number generator. Resident-mentor interviews generated 3 themes: protective role of reflection, motivation and satisfaction with being a mentor, and negative effect of the pandemic on their training and wellbeing. Participants felt their wellness increased as they reflected on their journey to residency through this program. Giving back was identified as the primary motivator for participating, as they felt a need to pay forward the mentorship they received as students. Participants saw social isolation as the key factor causing burnout and was the most negative effect from the pandemic.
Conclusion: While there is a role for wellness initiatives that target individual residents, more salient is engagement on a systemic level. We examined resident-mentors' experiences in near-peer mentoring in relation to their wellness during the COVID-19 pandemic and uncovered overarching perceived benefits of being a near-peer mentor, via self-reflection, sense of purpose and giving back, and meaningful social engagement.
Keywords: wellness, mentorship

PO095

Are FOAM users willing to pay for what they get for free? A willingness-to-pay study of end-users from the Free Open Access Medical education (FOAM) movement

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Introduction: The Free Open Access Medical education (FOAM) movement has sought to disrupt traditional business models of education - breaking down paywalls and decreasing costs. However, nothing is truly free. Prior research has sought to valuate FOAM using various methods based on traditional advertising revenue mechanisms or library costs, but did not consider end-users perspectives on their value of the open educational resources created by the FOAM movement. Market research processes have shown that it is possible to generate useful modeling by seeking valuation data from end-users directly. We aimed to apply these principles to a selection of top FOAM resources.
Methods: We designed a survey-based study aimed at determining the Willingness-to-Pay (WTP) of FOAM users. After receiving research ethics board approval, the survey was promoted on social media (Twitter, Facebook, and LinkedIn), as well as to those METRIQ study collaborators who had previously agreed to be contacted on our listserv. The 42-question survey was piloted upon non-participating members of our research team. Then we sent the survey to all those registered for our study (the METRIQ 4 study) from July 26, 2021 to Jan 25, 2022. We then conducted a Willingness-to-Pay (WTP) analysis to determine a theoretical value for 7 FOAM sites: Academic Life in Emergency Medicine, CanadiEM, Life in the Fast Lane, REBEL EM, Emergency Medicine Cases, EMCrit, and St. Emlyn's. Nonrespondents were reminded to answer the survey a total of three times. No incentive was given to participants. Data were presented descriptively with mean (M) and standard deviation (SD).
Results: A total of 132 members of the FOAM community registered to participate. A total of 128 (97.0%) completed the survey. Of these, 89.4% of all respondents expressed WTP for at least one of the 7 FOAM sites included for analysis. With respect to aggregate FOAM spending over these 7 resources, we found a high average WTP to access educational content ($M = \$317.09$ (USD), $SD = 312.46$). Average WTP values for individual sites ranged from a high of \$63.89 (USD) ($SD = 82.97$) to a low of \$23.78 ($SD = 41.36$).
Conclusion: Based on our WTP analysis of 7 selected FOAM sites, there appears to be a monetary value to their end-users. Further research is required to better model the anticipated economic value of FOAM. Research that profiles the exact demographic characteristics of various FOAM users would allow for an accurate theoretical value of each resource using the data we have generated.
Keywords: Free Open Access Medical education, willingness-to-pay, open educational resources

PO096

An external validation of the Canadian CT Head Rule and the National Emergency-X-Radiography Utilization Study II in a multicenter retrospective study

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Introduction: Mild traumatic brain injury (mTBI) is common in Emergency Department (ED) and is evaluated using computed tomography (CT) scans to search for cerebral lesions. However, CT scans involve radiation risk and prolonged waiting times. The Canadian CT Head Rule (CCHR) and the National Emergency X-Radiography Utilization Study II (NEXUS II) are clinical decision rules, proposed to detect patients with mTBI who do not need a CT scan. The aim of the study was to validate these rules in our population.
Methods: We propose a retrospective multicenter study that took place in 3 university EDs in Milan, including all patients who had a

CT scan for head trauma, aged 18 or older with a presentation Glasgow Coma Scale (GCS) score of 13 or higher from January 2018 to December 2019. We applied NEXUS II and CCHR, the latter regardless of the loss of consciousness, prolonged amnesia or disorientation. We considered as primary outcome any traumatic finding on CT scan and as secondary outcome neurosurgery or death. We determined the diagnostic accuracy of each rule and number needed to predict (NNP) a head lesion, calculated as the inverse of the difference between positive predictive value and false negative rate.

Results: We enrolled 3955 patients. Neurosurgery was performed in 7 cases (0.2%) and 2 patients (0.05%) died. CT lesions were found in 241 cases (6.1%). The NEXUS II had sensitivity (SN) of 88.4% (95% CI 87.3–89.4) and specificity (SP) of 33.5% (95% CI 32.1–35.0) for CT findings. The CCHR showed similar SN, 88.7% (95% CI 87.3–89.9), but better SP 44.7% (95% CI 42.7–46.7). The negative likelihood ratio (LR-) for CT lesions was 0.346 (95% CI 0.325–0.369) for NEXUS II and 0.254 (95% CI 0.233–0.276) for CCHR. The NNP for NEXUS II and CCHR was respectively 17 (95% CI 14–23) and 19 (95% CI 15–27). SN for neurosurgery or death was 100% (95% CI 99.9–100) for both NEXUS II and CCHR, with SP of 32.3% (95% CI 30.8–33.8) and 43.4% (95% CI 41.5–45.4) respectively. The best SN was achieved by applying all NEXUS II and CCHR variables to all patients. SN was 100% (95% CI 99.9–100) and SP 24.6% (95% CI 23.2–25.9) for death or neurosurgery and SN 96.7% (95% CI 96.1–97.2) and SP 25.9% (95% CI 24.5–27.3) for CT lesions. In this case, the LR- and the NNP were lower, 0.128 (95% CI 0.121–0.136) and 14 (95% CI 12–17).

Conclusion: Nexus II and CCHR had similar accuracy in our population. The most sensitive strategy to detect CT lesions could be to assess each variable of the two rules, allowing to reduce 24.5% of CT scans.

Keywords: mild traumatic brain injury, CT scan, clinical decision rule

PO097

Improving early recognition and treatment of sepsis in paramedic services and the emergency department: a cross-Canada survey

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Introduction: Most patients with sepsis present through emergency departments (EDs), many arriving via paramedics. Recognizing and managing sepsis is challenging, and failure of early recognition and treatment impacts mortality. Our objective is to identify and understand barriers and facilitators to the implementation of best practice (Surviving Sepsis Campaign (SSC) guidelines) among paramedics and ED nurses and physicians.

Methods: A survey was conducted as part of a mixed-methods study that includes a literature review and interviews. The survey, reported here, was designed by our team for an online platform, Opinio. Open-ended and Likert-scale pre-populated questions asked about barriers and opportunities, using the Theoretical Domains Framework. Questions were scored for face and content validity and refined prior to distribution in French and English. Invitations were distributed by various professional organizations for paramedics, ED nurses and physicians, with two bi-weekly reminders and advertisement on social media.

Results: The survey was open from August 4 to December 31, 2022. A total of 843 surveys were completed: 314 (37%) paramedics, 226 (27%) physicians, 168 (20%) registered nurses. Close to half (46%, n = 339) have 10+ years of work experience. 41% identified as male, 47% female, 12% as undifferentiated/n/a. 65% (472) work in urban settings, with 24 (6%) in tertiary care. Paramedic call volume varied, with 44% (n = 143) responding to 10,000 or fewer calls per year, 48% (n = 156) 200,000–500,000. At least 10 responses were received from each province/the Territories. Bed availability and/or offload delay (77%, n = 389), patient/public recognition of seriousness of sepsis (n = 360, n = 72%), patient/public recognition of sepsis symptoms (n = 351, 70%), and timely initiation of treatment (n = 256, 50%). Respondents agreed/strongly agreed they have the skills to manage a septic patient (n = 406, 90%), with a high level of trust in the strength of evidence supporting the SSC (n = 366, 81%). Prehospital antibiotics, pre-alerts, reinforcement strategies, and timely return of lab results show promise; peer influence and awareness do not.

Conclusion: A survey of Canadian paramedics, ED nurses and physicians identified system-level issues and public awareness as barriers to early recognition and treatment of sepsis. There is trust in the guidelines, and opportunities for earlier intervention are identified. Barriers and enablers will be explored in greater depth in upcoming interviews.

Keywords: emergency services, sepsis, barriers

PO098

Paramedics Providing Palliative Care at Home program associated with increase in days at home and home deaths: a provincial comparison

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Introduction: Background: The Nova Scotia (NS) Paramedics Providing Palliative Care at Home Program ('the Program') aligns paramedic treatment with patient's palliative goals of care. We aimed to determine whether the Program is associated with increased (1) days at home (versus hospital) in the last six months of life, and (2) home deaths. We compared pre-post program and also with British Columbia (BC), a province without a paramedic palliative care program.

Methods: Non-sudden chronic disease deaths were included for the study period: January 1, 2014 -March 31, 2015 (pre) and July 1, 2015 - December 31, 2016 (post) (April-June excluded for NS program launch). Paramedic chart, Discharge Abstract Database, National Ambulatory Care Reporting System, vital statistics, and physician billings were linked; provinces were analyzed separately. Descriptive analyses examined patient characteristics. Hurdle model regression analyses showed best fit.

Results: At 180 days before death, The NS cohort comprised 10,378 subjects (pre) and 14,229 (post), and BC 21,072 (pre) and 33,948 (post). Median age was 80 years (IQR 77.5–88) pre/79 years (IQR 77.2–88) post in NS, versus 77 years (IQR 65–86) pre and 76 years (IQR 65–86) post in BC. Females represent 36.2%/32.6% pre/post in NS and 43.8%/43.9% pre/post in BC. The baseline odds of days in hospital are 1.53 in NS and 3.41 in BC; the odds decreased by 37% post ($p < 0.001$) in NS, and 8% in BC. Median days at home in the last 180 days of life were 168 (IQR 151–177) (pre)/169 (IQR 152–178) (post) in BC, versus 172 (IQR 154–179)/175 (IQR 158–180) in NS ($p < 0.01$). Home deaths in BC accounted for 47.4% pre/49.5% post, versus 47.2% pre/67.3% post in NS.

Conclusion: A significant increase in home deaths and days at home in the last 180 days of life seen both pre-post and when compared to a province without the program provides evidence of the positive impact of Paramedics and Palliative Care.

Keywords: health services research, paramedicine, mobile integrated care

PO099

Establishing an objective history section of the HEART score using natural language processing

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Introduction: Natural language processing (NLP) is an emerging field that can reduce physician subjectivity associated with the HEART score, an emergency department (ED) risk stratification tool for chest pain. Our objective was to explore the role of NLP in predicting the history component of the HEART score using patient disposition as a surrogate.
Methods: This was a retrospective cohort study of 1013 patients presenting to the Ottawa Hospital's Civic and General EDs with chest pain. We abstracted patient characteristics, ED visit information, documented clinical text, and 6-week major adverse cardiac events (MACE) including all-cause mortality, myocardial infarction, and primary revascularization. The patient disposition was categorized into family physician follow-up (FPFU), outpatient cardiology follow-up (OC), and in-ED cardiology consultation (EDC). Using Cohere's NLP platform, we created numerical embeddings for the history section, trained a classifier to predict disposition, and identified the significant keywords associated with ED disposition using a two-proportion z-test.
Results: 1013 eligible patient visits (females: 51.8%, mean age: 55.7 years) were included with the following dispositions: FPFU: 794, OC: 96, EDC: 123. 667 patients had a normal ECG (FPFU: 71.9%, OC: 64.5%, EDC: 32.8%). 219 patients had at least one abnormal troponin result (FPFU: 14.9%, OC: 19.8%, EDC: 72.4%). 66 patients suffered MACE (NSTEMI: 40, STEMI: 3, revascularization: 19, deaths: 4). The embeddings aligned with the correct ED disposition in 37.7% of cases and the classifier provided a 33.6% disposition prediction accuracy. The classifier had higher prediction accuracies for the OC and EDC sub-groups, 65.6% and 48.8% respectively. NLP identified the following unique words for the FPFU group (fever, pleuritic, cough) and EDC group (nitro, exertion, pressure). Through manual extraction, the presence of symptoms described using the words 'pressure' ($p < 0.001$), 'exertion' ($p < 0.001$), and 'pleuritic' ($p = 0.03$) were determined to be statistically significant between the two groups.
Conclusion: The embeddings and classifier accurately predicted disposition for one-third of patients with increased classifier accuracy for the OC and EDC sub-groups. Furthermore, the presence of the following chest pain descriptors: 'pressure', 'exertion', and 'pleuritic' was associated with ED dispositions. Future large- scale prospective studies are needed to improve accuracy of prediction models.
Keywords: natural language processing, HEART score, ED disposition

PO100

A bidirectional virtual teaching platform for postgraduate point-of-care ultrasound training: a pilot study

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Innovation Concept: Rural point-of-care ultrasound (POCUS) has been an active area in current research as it relates to more equitable patient outcome. Image generation is highly user dependant and requires skilled interpretation, thus operator education is essential for safe uptake. Although ultrasound devices are becoming more accessible, lack of training and absence of local mentors are reported as barriers to uptake of POCUS. For this reason, the demand for a remotely delivered POCUS curriculum is high. Virtual attempts have been successful in furthering POCUS knowledge but there have been many restrictions identified. Limitations consist of complex and expensive technology requirement, and lack of interaction between learner and teacher; further specifying a demand for a collaborative, low cost and easy to implement remote delivery system. The purpose of this pilot study was to develop and provide initial validity for such a virtual POCUS education method.
Methods: During an in-person IP POCUS course, one station was set up to simulate remote delivery using a novel bidirectional approach. With teacher and learner in separate rooms each were connected via online WebEx meeting. Each room had one computer connected to a USB webcam, which was directed toward a patient to show probe positioning. A second computer was connected to a POCUS machine to show image generation. Both video outputs of the learner were displayed on instructor's WebEx screen simultaneously while the opposite was true for the learner's screen. An 18 question, 5-point Likert scale survey was then used to assess learning objectives, ability to virtually address learning needs and willingness of participants to pursue virtual certification of POCUS skills.
Curriculum, Tool or Material: 18 limited exposure, first year medical residents, participated in all stations and completed the survey post-instruction. Most participants agreed, or strongly agreed, that the virtual station was either somewhat or extremely easy with respect to following direction, instructor interaction, and ability to provide feedback. Majority of learners also reported high linterest of pursuing IP-POCUS certification through virtual pathways
Conclusion: While larger participant studies are needed to elicit statistically significant results, this low-cost, easy to implement pilot study demonstrates that the proposed delivery set-up is well tolerated by learners and can effectively teach POCUS skills. It further solidifies the demand for remotely delivered IP course certification.
Keywords: innovations in emergency medicine education, point of care, ultrasound

PO101

Academic emergency physicians' motivation for undertaking rural locums

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Introduction: Increasing number of rural hospitals face challenges in staffing their departments in recent years. In Ontario, this demand is being addressed by Health Force Ontario (HFO) in addition to individually arranged locums. Financial incentives are sometimes attached to shifts in these localities.Tertiary and academic emergency department physicians often seek opportunities to cover shifts in such rural underserviced areas.This project looks to understand academic EM physicians' locum practice patterns and their motivation for seeking such opportunities. It is hypothesized that these decisions are influenced by other advantages beyond financial incentives. Knowing these factors may enable academic departments to make changes that retain academic physicians
Methods: An anonymous 10-question electronic survey was distributed to 85 academic staff physicians working at an urban tertiary Emergency department through Qualtrics. Demographics and locum practice pattern related information was collected.

Motivational factors for participating in locums and challenges faced while completing them were analyzed using a 5-point Likert scale. Appropriate REB approval was obtained through our institution.
Results: 32 surveys were included in the final analysis with a response rate of 37.6%. 59.7% of respondents reported participating in rural locums. Of the respondents who participate in locums, 64.7% report working only through HFO. 77.8% of the respondents reported locums to be a long-term aspect of their EM practice. Amount of bureaucracy, financial renumeration, ability to choose shifts, satisfaction of providing care at an underserved area, and patient flow were identified as the most important motivating factors with 83.3%, 77.8%, 77.8%, 77.8%, and 72.2% rating them as important or very important.
Conclusion: More than half the respondents (academic urban physicians) participate in rural locums. Amount of bureaucracy, financial renumeration, patient flow, physician satisfaction and ability to choose shifts appear to be the main motivational factors. Further studies should focus on motivational factors for physicians in other centers and assess sustainability of locum coverage. Such motivating factors may be applied more globally to sustain the recruitment and retention of academic physicians within teritary centres.
Keywords: rural locums

PO102

A population-based cohort study: examining the characteristics and patterns of health care use among patients receiving palliative care who have frequent use of the emergency department services during the pandemic

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Introduction: Due to the health crisis inflicted by the pandemic, frequent use of the emergency department (ED) has become a key subject of study. However, it is unknown how ED use has changed among patients receiving palliative care. This study aims to identify and examine the health care use patterns of patients receiving palliative care who experience high use of the ED during the first year of the pandemic.
Methods: A cohort descriptive study was undertaken in the former Hamilton Niagara Haldimand Brant Local Health Integration Network geography. It examined 662 patients receiving palliative care who had high ED use (5+ ED visits) during the fiscal year 2020/21. Using data from the National Ambulatory Care Reporting System, Discharge Abstract Database, and Client Health and Related Information System accessed through Integrated Decision Support, information was collected on patients receiving palliative care, including their demographics, home care status, ambulance use, and hospitalization characteristics.
Results: 13,818 individuals had high ED use and 662 (4%) of these patients were receiving palliative care (average age: 72, SD: 14, range: 21–102). 54% of these patients had one year of previous high ED use and 23% had two years of high ED use. 419 patients (63%) had high ED use for the first time in the 2020/21 fiscal year. 88% ($n = 582$) of these patients received home care services while 98% ($n = 650$) had a primary care physician. The 662 patients made 4562 ED visits with an average of 7 visits per individual (IQR: 2, range: 5–39). 52% of these visits had an ambulance arrival with an average of 4 arrivals per patient (SD: 3, median: 4, IQR: 2, range: 1-34). Of the patients, 647 (98%) had at least one hospitalization with 46% of the visits resulting in hospitalization (average: 3, SD: 2, IQR: 2, range: 1–15). Of the hospitalized patients, 35% had an ICU stay that lasted 8 days on average (SD: 10, IQR: 8, range: 1–74). 17% of the patients who were hospitalized had an alternate level of care (ALC) stay that averaged 17 days (SD: 15, IQR: 20, range: 1–85).
Conclusion: The majority of patients receiving palliative care who utilize the health care system have a single year of high ED usage, making them a small group that needs attention. High ED use among this population occurred during the pandemic despite the majority of the patients having primary care physicians and having access to home care services, indicating the need for better examination into the health care system at the community level.
Keywords: emergency, hospitalization, palliative

PO103

Pilot in utility of private event medicine for emergency public healthcare resource conservation

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Introduction: Mass Gathering (MG) events return to society at a time where hospital personnel and resources are increasingly scarce. The impact of these events are yet to be explored. This research is a preliminary step in assessing the impact of privately organized MG events on local public healthcare infrastructure.
Methods: Retrospective paper chart review of incident reports recorded by Mosaic Medical staff was completed for 7 MG events in London Ontario. Demographic variables, presenting vitals, initial assessment, and necessity for ambulance transfer on disposition. Descriptive statistics analysis was completed. No inferential statistics were completed. Standard First Aid (SFA) guidelines, via Canadian Red Cross, were used as indications for lay-persons to contact Emergency Medical Services (EMS). Incident reports were secondarily reviewed for management provided on-site by healthcare practitioners and disposition. A total of 189 incident reports were initially screened for requirements to contact EMS. All charts had secondary screening for actual disposition after interaction with healthcare practitioners.
Results: A total of 189 incident reports/patients were included in the analysis. The median age of eventgoers requiring medical assessment was 20.00 years, with IQR 18.00–25.75. 77 male, 95 female, and 17 unreported. The most common presentation were musculoskeletal injuries followed by alcohol intoxication. In total, 7 ambulances were called for all 189 patients given full medical assessment. By retrospective review approximately 102 patients, about 54%, met SFA guidelines for contact with EMS.
Conclusion: Preliminary findings suggest healthcare practitioners are assets at private events in relieving use of public healthcare infrastructure. These events have substantial logistical challenges without healthcare practitioners present as lay-persons are left to manage medical concerns of any complexity. Limitations first include the lack of standardization at events without medical teams present. This represents a major barrier to sound statistical analysis with EMS service as a measure of public healthcare use. Further, the nature of these evets are largely similar in demographic and presentations limiting external validity. In short, this pilot presents introductory evidence warranting further investigation into public healthcare resource use during private MG events. Further investigation may include increased events, capturing emergency department wait-times, or ambulance off-load delays.
Keywords: mass gathering, event medicine

PO104

Evaluation of virtual care outcomes: a retrospective QUality and safety analysis (EVOQUe) - equity and marginalization assessment

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Introduction: Virtual care has become a mainstay of modern clinical care, accelerated by the COVID-19 pandemic, starting in March 2020. By April 2020, over 70% of all healthcare visits in Ontario were conducted virtually. Despite these significant changes in health care delivery, little guidance is available regarding the clinical use of virtual care, compounded by an absence of data assessing how access to healthcare for Ontario's most vulnerable populations has been impacted.
Methods: The objective of this study was to compare the differences in virtual care utilization in Ontario across degrees of marginalization, through a retrospective observational study of the ICES administrative health databases during the COVID-19 pandemic, from March 2020 to March 2022. The outcome measures for healthcare access are represented by mean visit rate per 1000 residents, based on their ONMARG Score, a data tool that combines a wide range of demographic indicators into four distinct dimensions of marginalization. Geographic areas, or distribution areas (N = 19687), were grouped into overall and component ONMARG quintiles, and compared.
Results: During the pandemic, when comparing the most marginalized (Q5) to the least marginalized (Q1) by Deprivation (Q5 Mean = 3104.23, CI = 3075.35–3134.33 v Q1 Mean = 3512.54, CI = 3483.99–3539.84), and Instability scores (Q5 Mean = 3330.29, CI = 3297.41–3363.14 v Q1 Mean = 3603.31, CI = 3573.06–3630.09) were strongly associated with lower rates of access to healthcare by virtual care. A similar, yet less linear association existed for areas with a high Dependency (Q5 Mean = 3324.39, CI = 3291.43–3356.35 v Q1 Mean = 3383.90, CI = 3357.68–3411.50) score. Within Ethnic Diversity, the most marginalized (Q5) were strongly associated with higher rates of access to healthcare by virtual care, compared to the least marginalized (Q1), similar to ONMARG summary scores.
Conclusion: For some of Ontario's most marginalized populations, the transition to virtual care established barriers to accessing healthcare. The ONMARG dimensions most corresponding to poverty and attainment of basic needs (deprivation) and lesser access to housing (instability) were most associated with lower virtual care use. Measures of income from employment (dependency) displayed less linear relationships, and visible minorities and recent immigrants (ethnic diversity) were associated with increased virtual care use likely attributable to the "healthy immigrant effect".
Keywords: equity, virtual care, COVID-19 pandemic

PO105

Evaluation of virtual care outcomes: a retrospective QUality and safety analysis (EVOQUe) - resource utilization

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Introduction: Virtual care has become a mainstay of modern clinical care, accelerated by the COVID-19 pandemic, starting in March 2020. By April 2020, over 70% of all healthcare visits in Ontario were conducted virtually. Despite these significant changes in health care delivery, little guidance is available regarding the clinical use of virtual care, compounded by an absence of data assessing how resource utilization has been affected throughout the pandemic.
Methods: The objective of this study was to compare resource utilization differences between virtual care and in-person care in Ontario through a retrospective observational study of the ICES administrative health databases during the COVID-19 pandemic, from March 2020 to March 2022. The outcome measures for resource utilization included investigations (N = 23,999,002 matched OHIP encounters) and prescriptions (N = 14,849,994 matched OHIP encounters among ODB patient encounters). Prescriptions were grouped into analgesics (opiate and non-opiate) and antibiotic classes from 7-days prior to visit, and then 30-days after. Imaging utilization was evaluated using radiologist billings comparisons for x-rays, ultrasound, CT and MRI. Lab comparisons were evaluated using data derived from outpatient labs. Standardized differences of 0.1 were accepted as a significant statistical difference in comparisons.
Results: In assessing prescribing patterns, there were no significant differences in prescribing practices between intra-pandemic virtual care and intra-pandemic in-person care. However, when assessing investigation patterns between intra-pandemic virtual care and intra-pandemic in-person care, there were statistically significant differences in utilization of x-ray (N(%) = 947,854 (7.90%) v 1618,001 (13.48%), SD = 0.18), ultrasound (N(%) = 1053,803 (8.78%) v 1420,090 (11.83%), SD = 0.10), CT (N(%) = 526,356 (4.39%) v 788,452 (6.57%), SD = 0.10), microbiology (N(%) = 656,606 (5.47%) v 984,263 (8.20%), SD = 0.11), and anatomical pathology (N(%) = 236,270 (1.97%) v 595,732 (4.96%), SD = 0.16). There were no differences in ordering MRIs, biochemistry investigations, or hematology investigations.
Conclusion: When comparing intra-pandemic resource utilization, there were no significant differences in prescribing patterns between virtual care and in-person care. There were significant increases in investigation rates with in-person care, compared to virtual care, related to x-ray, ultrasound, CT, microbiology, and anatomical pathology.
Keywords: virtual care, resource utilization, pandemic

PO106

Évaluation de l'impact des transferts de CHSLD vers un département d'urgence

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Background and Aim Statement: Le vieillissement de la population a entrainé une augmentation du volume de personnes âgées qui consultent à l'urgence ou y sont transférés depuis leurs résidence, et ce problème s'est aggravé depuis la pandémie. L'achalandage au département d'urgence (DU) a également augmenté de manière significative dans les dix dernières années et plusieurs pistes solutions sont recherchées afin de limiter son utilisation. Le but de cette étude est de décrire l'impact des transferts à partir de centres hospitaliers de soins de longue durée (CHSLD) vers le DU et l'utilisation de ses ressources en temps de forte occupation de civières.
Measures and Design: Pour cette étude rétrospective, nous avons analysé les dossiers médicaux de patients ayant été transférés à l'urgence depuis leur CHSLD en grande période d'achalandage, soit de mai à septembre 2022. Des statistiques descriptives ont été effectuées (moyenne, écart-type) afin de décrire la raison de consultation, la priorité au triage, le délai de prise en charge médicale, les investigations effectuées, l'admission, la durée moyenne de séjour (DMS) ainsi que la durée de soins actifs. Une demande d'accès à l'information a été faite auprès du Ministère de la Santé et des Services Sociaux (MSSS) afin d'obtenir les statistiques provinciales de DMS pour la période étudiée.
Evaluation/results: Nous avons identifié 139 patients (âge moyen = 78) transférés de CHSLD à notre DU. Le patron d'heure d'arrivée démontre que les patients sont surtout transférés en heure défavorable

(67% soir-nuit). 96% requiert des examens de laboratoire ou d'imagerie et une consultation spécialisée. Ils représentent 0.58% des consultations à l'urgence, mais ont occupé 2.55% des heures sur civière durant la période étudiée. Leur DMS (29.2h) est nettement plus élevée que la DMS globale de notre urgence (7.6h), la DMS provinciale (17.8h) et la DMS des personnes de 75 ans et plus (23.7h) pour la même période. Ces patients attendent en moyenne 4.3 h leur transport pour rentrer au CHSLD. Ce temps d'attente est nettement plus long pour le transport ambulancier (7.3 h).
Discussion/impact: Les patients transférés de CHSLD ont une DMS nettement plus élevée que la population générale et nécessitent tous des ressources propres au DU. Des initiatives pour assurer la pertinence et optimiser les transferts vers le DU pourraient avoir un impact favorable sur la DMS globale et la performance des DU.
Keywords: quality improvement and patient safety, patient transfer, long-term care residents

PO107

Association between emergency department use with primary care provider status and the effects of COVID-19 on this association

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Introduction: Inappropriate visits to the emergency department (ED) for minor medical problems that could be more appropriately treated in an outpatient, primary care office, are a growing problem. Our objective was to evaluate the association between ED use and whether a patient has a primary care provider (family doctor). A second objective was to compare ED user characteristics before and after the onset of the COVID-19 pandemic.
Methods: This was a retrospective chart study of electronic health records (EHR) of patients who used the ED at The Ottawa Hospital between August 1, 2019 to July 31, 2021. Inclusion criteria included age 18 years or older, Ontario resident, not defined as a high frequency user (HFU), and data not limited by privacy protection through the EHR. Patients were defined as having a primary care physician if there was one listed in the EHR. ED data was compared against patient attachment data from Ontario Health Teams for the Ottawa region. Categorical and continuous variable comparisons were conducted using chi-squared tests and student's t-test respectively. Significance was set at $p < 0.05$. Where multiple comparisons were made, Bonferroni Correction was applied.
Results: A total of 282,056 visits from 156,288 non-HFU were included. Overall, 85% of all patients had a family doctor listed which varied widely by age group (70.7% in age 19-34 vs 97.1% for age 80+). In patients aged < 50 in Ottawa, 87.5% are attached to a family doctor, while only 75.3% of ED users had a family doctor. Patients without a family doctor presented with more low acuity presentations (average CTAS 3.1 vs 2.9) and were less likely to be admitted to hospital. The proportion of patient with a primary care provider was not different after the onset of the COVID-19 pandemic (85.0% vs 84.6%).
Conclusion: This study demonstrated that the population of ED users in Ottawa were less likely to have a family doctor than the average population, particularly in younger patient cohorts (< 50 years old). Having a family doctor listed is associated with fewer low-acuity presentations to the ED. There is possibly a role for targeting improved access to family doctors or other providers in younger patients to offload some of the burden on ED. In Ottawa, the shift to increased phone and virtual-care during the COVID-19 pandemic did not have a significant effect on the proportion of patients with a family doctor presenting to the ED.
Keywords: COVID-19, family doctor

PO108

Women at the top: a qualitative study of women in leadership positions in emergency medicine in Canada

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Introduction: For the last two decades more than half of Canadian medical students have been women, with an increasing number of trainees choosing emergency medicine as their careers. Despite a proportional increase in women in full-time faculty positions in emergency medicine, women are still underrepresented in leadership roles. The purpose of this study is to examine the experiences of women leaders in emergency medicine to identify common themes that may have contributed to their acquisition of leadership roles.
Methods: Participants included female emergency medicine physicians in Canada who currently hold or previously held an academic or administrative leadership position. Data was collected through semi-structured interviews. Inductive thematic analysis was performed on the interview transcripts. Transcribed data was coded and categorized into recurrent themes. A narrative summary of the most common themes that emerged were presented.
Results: A total of twenty participants were interviewed. Fifty percent held academic, and fifty percent held administrative leadership roles. Most participants perceived career opportunities were due to chance, related to personal skillset, or required additional training. Participants highlighted the importance of mentorship and sponsorship in their path to leadership. Gender expectations and traditional gender roles were perceived as having a negative impact on career success. Suggestions from women leaders included applying for leadership positions earlier than expected, networking, and advocated for women in leadership to empower younger generations of women to become leaders. Recommended changes to leadership structures included explicit parental leave policies, flexible scheduling, and job sharing to encourage women leaders.
Conclusion: To date, there has been no Canadian specific study investigating factors contributing to the success of women leaders in emergency medicine. This study examines career advancement of women leaders in emergency medicine and provides useful insight to those aspiring to grow their careers, as well as to mentors and sponsors of women in emergency medicine.
Keywords: leadership, women, Canada

PO109

Family caregiver emotional and communication needs in Canadian pediatric emergency departments

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Introduction: Pediatric emergency departments (EDs) have been identified as inherently stressful for families, making it challenging to meet families' global needs beyond urgent medical care. There is a paucity of research describing how effectively the emotional and communication needs of family caregivers are met during ED visits.

Our objective was to describe the extent to which caregivers' emotional and communication needs were met during pediatric ED visits and relate these findings to demographic characteristics.
Methods: Electronic surveys with medical record review were deployed at 10 Canadian pediatric EDs from October 2018 to March 2020. A convenience sample of families with children < 18 years presenting to a pediatric ED were enrolled, for 1 week every 3 months, for 1 year per site. Caregivers completed one survey in the ED and a follow-up survey up to 7 days post-visit.
Results: We recruited 2005 caregivers who were mostly mothers (74.3%, 1462/1969); mean age was 37.8 years (SD 7.7). 71.7% (1081/1507) of caregivers felt their emotional needs were met. Staff physicians (35.6% (535/1502)), bedside nurses (24.2% (364/1502)), residents/ students (13.8% (207/1502)) and triage nurses (12.4% (186/1502)) were identified as providing the best emotional support to caregivers. 86.4% (1293/1496) identified communication with the doctor as good/very good and 83.4% (1249/1498) with their child's nurse. Caregiver involvement in their child's care was reported as good/very good 85.6% (1271/1485) of the time. 81.8% (1074/1313) of caregivers felt comfortable in caring for their child at home after discharge. Higher acuity, being the father (vs. mother), lower caregiver anxiety, respect for the child's privacy, caregiver involvement in their child's care, satisfactory updates, and having questions adequately addressed positively impacted caregiver emotional needs. Caregivers feeling less scared during an ED visit, having lower anxiety, more involvement in their child's care, satisfactory updates, and having questions adequately addressed increased their comfort in caring for their child's illness at home.
Conclusion: Approximately 30% of caregivers presenting to pediatric EDs have unmet emotional needs, over 15% have unmet communication needs, and 15% felt inadequately involved in their child's care, challenging healthcare providers to do better. Family caregiver involvement in care and good communication from ED staff are key elements in improving overall patient experience and satisfaction.
Keywords: family needs, parents, communication

PO110

Factors that influence parental decision-making regarding analgesia for their children with musculoskeletal injury-related pain: a qualitative study

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Introduction: Parents/caregivers are often the gatekeepers to the pharmacologic management of their children's pain. Concerns and preferences regarding medications, including opioids, influence their choices. Our primary objective was to explore and understand caregiver decision-making as it relates to acute pain management for their children presenting to the emergency department.
Methods: This study employed one-on-one semi-structured interviews. Parents of children with acute musculoskeletal injuries were recruited from 3 Canadian pediatric emergency departments. Interviews were conducted via telephone from June 2019 to March 2021. Verbatim transcription and thematic analyses occurred concurrently with data collection, supporting data saturation and theory development considerations.
Results: Twenty-seven interviews were completed. Five major themes regarding pain assessment and treatment emerged: (a) My child's comfort is a priority; (b) Every situation is unique; (c) Opioids only if necessary; (d) Considerations when choosing opioids; and (e) Pain research is important. Overall, parents were highly comfortable with their assessment of their child's pain. Participants' willingness to use opioid analgesia for their children was primarily dependent on perceptions of injury and pain severity. Opioid-averse and opioid-accepting families had similar considerations when making analgesic decisions but weighed risks and benefits differently.
Conclusion: Parents assess and manage their children's pain globally and multi-modally, with comfort being prioritized. For most parents, the desire to relieve their children's pain outweighed concerns of substance use disorder, misuse, and adverse events when making decisions about opioid analgesia for short-term use. These results can inform evidence-based family-centered approaches to co-decision-making of analgesic plans for children with acute pain.
Keywords: opioids, parents, children

PO111

Initial fibrinogen levels in massively bleeding trauma patients: a single centre, retrospective cohort study

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Introduction: Trauma remains one of the major causes of death and hemorrhage is a leading preventable cause of mortality for injured patients. Fibrinogen is important for hemostasis. In the massively bleeding injured patient, fibrinogen levels drop to low levels early after trauma. Many institutions suggest fibrinogen replacement in response to low fibrinogen levels and early administration of fibrinogen supplements may improve survival.
The primary objective of this study was to explore the impact of early transfusion requirements, clinical parameters, and biochemical markers on the need for fibrinogen supplementation for severely injured patients.
Methods: This is a retrospective cohort study of trauma patients presenting to St. Michael's Hospital between January 01, 2016 to June 30, 2021 and aged > 18 years. We excluded patients who died before blood work was drawn. The primary outcome was the need for fibrinogen supplementation which was defined as an initial fibrinogen level below 1.5g/L. Variables of interest included: age, base excess in trauma bay, injury type, number of blood products received, time from injury, and blood pressure. A multivariable logistic regression model explored the relationship between these variables and an initial fibrinogen level of < 1.5g/L.
Results: A total of 4936 patients met inclusion criteria, of which 155 (3%) patients had their initial fibrinogen level of < 1.5g/L. 969 (20%) patients had penetrating injuries. The median age was 43 years and 73% were male.
The adjusted odds of having fibrinogen level < 1.5g/L increased for every unit of blood product transfused (OR $= 1.18$, 95% CI $= [1.10, 1.26]$), when systolic blood pressures were between 70-89 and 90-119 respectively (OR $= 1.99$, 95% CI $= [0.22, 30.2]$, (OR $= 1.24$, 95% CI $= [0.14, 18.6]$, respectively), and with each hour following injury (OR $= 1.04$, 95% CI $= [0.99, 1.07]$). The odds of having fibrinogen level < 1.5g/L decreased with increasing base excess (OR $= 0.84$, 95% CI $= [0.81, 0.87]$) and with penetrating injuries (OR $= 0.43$, 95% CI $= [0.21$ to $0.83]$).
Conclusion: Empiric fibrinogen replacement may be considered after a few units of transfusion, having low base excess, and delayed presentation after the injury. Given the delay to get an actual fibrinogen level, empiric fibrinogen replacement may allow for correction of coagulopathy earlier on.
Keywords: trauma, fibrinogen level, massive hemorrhage protocol

PO112

Attitudes of Canadian general surgery staff and residents towards point of care ultrasound

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Introduction: Point of Care Ultrasound (POCUS) has been implemented in many specialties' teaching curriculum. However, it is yet to be widely embraced in General Surgery (GS). This survey aims to identify the attitude of the GS Canadian academic community towards POCUS.
Methods: A multiple-choice online survey was sent to all Canadian GS programs through the offices of program directors (June–August 2021). The survey was comprised of three sections: participant information, current perceived knowledge of POCUS, and barriers to POCUS implementation in training programs and clinical practice. Results were expressed as ratios. P value of < 0.05 was considered significant.
Results: The targeted sample included 609 surgeons and 593 residents (total 1202). Of those, 58 surgeons and 79 residents responded to the survey, (11.3% response rate).
Overall, only 5.2% reported using POCUS daily and 44.8% of staff surgeons reported having never used POCUS. The most common reported indications included eFAST and insertion of central lines. Only 8.6% used POCUS to assess for cholelithiasis. Staff surgeons were reluctant to operate based solely on findings of POCUS. However, compared with residents, attendings were more likely to operate on patients based on POCUS findings for appendicitis (30/58 (51.7%) VS. 28/79 (35.4%) $p = 0.042$).

A majority of residents (69.5%) believed that POCUS should be implemented in training programs. However, only 21.5% reported having an official POCUS curriculum. The applications most requested for inclusion in a training program included eFAST, assessment of shock, central line insertion and abscess drainage. The perceived accuracy of POCUS for various surgical indications (shock, gallstones, cholecystitis, appendicitis, bowel obstruction) was significantly less than what is reported in the literature.

The perceived barriers to POCUS implementation included lack of time for training, lack of confidence in POCUS, and concerns about medicolegal consequences.
Conclusion: This study reveals support for POCUS training by GS residents despite low current usage and reliance on its findings. Addressing barriers to its implementation and knowledge gaps about POCUS could lead to wider adoption.
Keywords: point of care ultrasound, general surgery, Canada

PO113

Dérivation du QuéBIC - quebec brain injury categories- pour les traumatismes crâniens légers avec saignement.

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Introduction: La prise en charge des Traumatismes Cranio-cérébraux Légers (TCCL) avec saignement intra-crânien au service des urgences a fait l'objet de nombreuses études au cours des dernières années. Notre objectif était de dériver une règle de décision clinique (RDC) avec des résultats centrés sur le patient pour guider les soins des TCCL compliqués.
Methods: Nous avons mené une étude de cohorte de dérivation rétrospective. Les patients TCCL compliqués âgés de ≥ 16 ans évalués dans l'un des trois centres de traumatologie de niveau 1 de la province de Québec ont été inclus. Notre critère de jugement principal était une combinaison d'intervention neurochirurgicale ou de décès ou de détérioration clinique. Nous avons effectué des analyses Set Covering Machine pour obtenir une RDC.
Results: Au total, 477 patients ont été inclus dans l'étude. Nous avons obtenu une RDC simple basée sur la stratification des risques en trois catégories. La première étape du QuéBIC est la présence d'une hémorragie sous-durale > 7 mm, qui constitue la catégorie à haut risque. Dans notre cohorte, 110 (23,0 %) patients remplissaient ce critère, et 40 (36,4 %) avaient l'issue combinée. La catégorie QueBIC à haut risque a une sensibilité et une spécificité pour détecter le risque de neurochirurgie ou de décès de 81,3 % et 83,5 %, respectivement. Les patients qui ne répondaient pas aux critères de haut risque, avaient un « risque modéré » en présence d' une hémorragie sous-durale > 4 mm, ou un score coma de Glasgow initial de 14 ou 13, ou une hémorragie intraparenchymateuse (HIP) > 7 mm ou plus d'une HIP ($n = 184$ [38,6 %]). Parmi ces patients, 32 (17,3 %) ont subi soit une intervention neurochirurgicale, ou présenté une détérioration clinique. Les patients restants ($n = 183$ [38,4 %]) ont été considérés comme à faible risque. Aucun d'entre eux n'a subi d'intervention neurochirurgicale ou de décès lié à un TCCL et 96,5 % n'ont présenté aucune détérioration clinique.
Conclusion: Notre RDC en trois étapes peut identifier les patients à haut risque et à risque modéré d'intervention neurochirurgicale ou de décès ou de détérioration clinique liés à un TCCL complexe. L'utilisation de ce CDR pourrait entraîner une utilisation plus optimale des ressources liées à la traumatologie. Une étude de validation prospective est nécessaire pour confirmer nos résultats avant la mise en œuvre clinique
Keywords: TCCL complexe, traumatisme crânien, neurochirurgie

PO114

Validation externe du score STUMBL pour les traumatismes thoraciques.

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Introduction: Les blessures thoraciques avec ou sans fractures costales sont des plaintes fréquentes au département des urgences (DU). Il existe plusieurs outils de décision clinique pour triager les patients vers l'admission ou la décharge, dont le score STUMBL. Nous avons effectué une validation externe du score STUMBL.
Objectif: valuer la validité externe du score STUMBL dans un centre tertiaire de traumatologie québécois quant aux complications liées aux traumatismes thoraciques contondants.
Methods: Une étude de validation externe rétrospective uni-centrique a été réalisée au sein des patients se présentant avec un mono-traumatisme thoracique contondant stable au département d'urgence de l'Hôpital de l'Enfant-Jésus. Les dossiers cliniques des patients de 2018-2020 ont été révisé consécutivement. Des analyses univariées incluant proportions, moyennes et médianes ont été effectuées afin de déterminer le score STUMBL significatif permettant de prédire les

issues suivantes : mortalité intra-hospitalière, complications pulmonaires à l'urgence, admission aux soins intensifs, délai d'hospitalisation prolongé, escalade des soins tardive et complications pulmonaires tardives.
Results: Un total de 400 patients ont été inclus. 254 (63.5%) étaient des hommes, 73 (18.3%) étaient sous un traitement anticoagulant pré-fracture, 58 (14.5%) présentaient une maladie pulmonaire chronique et 89 (22.3%) étaient des fumeurs. 397 (98.2%) présentaient une saturation supérieure ou égale à 90% au département d'urgence. Le mécanisme du traumatisme était le plus souvent une chute simple (198 patients ; 49.5%). La majorité des patients ont été libérés de l'urgence (362 patients ; 90.5%). Les analyses démontrent qu'un score STUMBL plus grand ou égal à la strate 16-20 (ou médian de 19) est prédicteur de mortalité intra-hospitalière, d'admission aux soins intensifs, de délai d'hospitalisation prolongé et d'escalade des soins tardives
Conclusion: Le seuil original du score de STUMBL de $\geq$ 12 permettant de prédire la survenue d'une hospitalisation ou d'une complication liée au traumatisme thoracique contondant n'est pas applicable à la population étudiée. Cependant, une coupure de $\geq$ 16 à 20 permet de prédire la mortalité intra-hospitalière, d'admission aux soins intensifs, de délai d'hospitalisation prolongé et d'escalade des soins tardives. Une validation externe prospective plus grande est cependant nécessaire avant l'utilisation généralisée de ce score de décision clinique.
Keyword: rib fracture

PO115

Prédiction des événements indésirables chez les patients gériatriques avec fracture de hanche isolée.

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Introduction: La fracture de la hanche est classée parmi les problématiques majeures de santé publique. Le taux d'incidence augmente de façon exponentielle avec le vieillissement progressif de la population et l'ostéoporose. Les patients âgés de 65 ans et plus se présentent souvent avec des troubles cognitifs, une polypharmacie et des comorbidités qui les exposent à un risque plus élevé d'événements indésirables. Peu d'études se sont concentrées sur les facteurs associés aux événements indésirables multiples chez les patients admis pour fracture de hanche. L'objectif de cette étude est d'identifier les facteurs associés aux événements indésirables chez les aînés admis pour fracture de hanche isolée.
Methods: Nous avons conduit une étude de base de données multicentrique chez les aînés admis pour fracture de hanche isolée dans 3 centres de traumatologie de niveau I. Nous avons exclu les décès avant l'arrivée aux urgences et les blessures concomitantes sévères. Pour identifier les facteurs associés à la présence d'un événement indésirable (mortalité, durée de séjour prolongée, complication, délirium, transfert vers centre de soins de longue durée), nous avons utilisé des modèles de régression logistique multivariés.
Results: Nous avons inclus 6220 patients admis pour fracture de hanche isolée. Environ, 73,4 % étaient des femmes, l'âge moyen était de 83,0 ($\pm$7,8). Les comorbidités, les blessures concomitantes et le mécanisme de blessure les plus fréquents étaient respectivement les maladies cardiovasculaires (24,9%), les blessures orthopédiques mineures associées (9,6%) et la chute de sa hauteur (69,5%). Environ, 23,8 % des patients avaient une durée de séjour prolongée, 18,8 % un transfert vers un centre de soins de longue durée, 11,5 % un délirium et 11,0 % une complication intra-hospitalière. Les facteurs de risque d'événements indésirables étaient l'âge $\geq$ 85 ans, (OR = 1,30 (95%CI 1,15-1,48)), la démence (OR = 3,51 (95%CI 2,96-4,16)), les maladies cardio-vasculaires (OR = 1,37 (1,16-1,61), les maladies rénales (OR = 1,32 (1,11-1,56)), et la chute de sa hauteur (2,49 (1,56-4,00)).
Conclusion: Nous avons identifié 5 facteurs prédictifs d'événements indésirables chez les aînés admis pour fracture de hanche isolée. Ces facteurs pourraient contribuer à l'optimisation des soins aux aînés admis pour fracture de hanche isolée.
Keywords: fracture, hanche, complication

PO116

Comparaison de la durée de séjour des patients transférés de centres hospitaliers de longue durée vers le département d'urgence

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Introduction: Le vieillissement de la population a entrainé une augmentation du volume de personnes âgées qui consultent à l'urgence ou y sont transférés depuis leurs résidence. Les personnes âgées ont des dossiers médicaux complexes et nécessitent une prise en charge multidisciplinaire lors de leur séjour au département d'urgence (DU). La durée de séjour (DS) est un indicateur utilisé afin de comparer la performance de différents DU, bien qu'il soit influencé par de nombreux facteurs non reliés au DU. Le but de cette étude est de comparer la DS des patients transférés de centre hospitalier de longue durée (CHSLD) aux DS moyennes provinciales et fédérales en temps de grand achalandage.
Methods: Pour cette étude rétrospective unicentrique, nous avons analysé les dossiers médicaux de patients ayant été transférés à l'urgence de l'hôpital du Sacré-Cœur de Montréal depuis leur CHSLD de mai à septembre 2022. Des statistiques descriptives ont été effectuées (moyenne, écart-type, médiane, percentiles) afin de mesurer la DS, définie comme étant la durée de temps sur civière par usager de l'arrivée jusqu'au départ du DU. Une demande d'accès à l'information a été faite auprès du Ministère de la Santé et des Services Sociaux (MSSS) afin d'obtenir les statistiques provinciales de DS moyenne pour la clientèle sur civière, ainsi que la DS spécifiquement pour les patients de 75 ans et plus (indicateurs 1.09.01 et 1.09.02). Au niveau fédéral, les DS médiane aux urgences a été obtenue sur le site de l'Institut canadien d'information sur la santé (ICIS).
Results: Nous avons identifié 139 patients (âge moyen = 79) transférés de CHSLD à notre DU. Leur DS (moyenne = 29.2h, écart-type 21h) est nettement plus élevée que la DS globale de notre urgence (moyenne = 7.6h), ainsi que la DS provinciale (moyenne = 17.8h) et la DS des personnes de 75 ans et plus (moyenne = 23.7h) pour la même période. La durée médiane de séjour des patients transférés de CHSLD à notre urgence est de 22.1h (écart interquartile = 9.5). Le 90^{e} percentile de DS pour ces patients dans notre DU est 62.8h, ce qui est plus du double du comparable canadien pour les personnes âgées de 65 ans et plus (29h).
Conclusion: Les patients transférés de CHSLD ont des durées de séjour nettement plus élevés que la population générale ainsi que la population âgée générale. Des initiatives pour assurer la pertinence des transferts vers le DU pourraient avoir un impact favorable sur l'occupation globale de civières et la performance des DU.

Keywords: geriatrics, crowding

PO117

Implantation d'un algorithme de dépistage du délirium aux urgences

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Introduction: L'apparition de délirium aux urgences ou à l'hôpital peut avoir de graves conséquences pour les patients âgés. Il a déjà été démontré que les professionnels de la santé ne parviennent pas à détecter le delirium dans plus de 50% des cas. L'objectif principal de cette étude est d'évaluer l'implantation d'un algorithme et outil de dépistage systématique du délirium chez les patients âgés traités aux urgences. L'objectif secondaire est d'explorer les opinions des infirmières concernant cet outil.
Methods: Cette étude mixte unicentrique suit un devis séquentiel explicatif. Les dossiers d'un échantillon aléatoire de dossiers de patients de 75 ans et plus ayant consulté aux urgences dans la période post-implantation ont été évalués. L'issue principale, la faisabilité, a été évaluée via la conformité au dépistage systématique des patients. Un sondage a ensuite été déployé pour mieux comprendre les opinions, obstacles et pistes de solution à l'utilisation de l'algorithme. Les données quantitatives ont fait l'objet d'une analyse descriptive et une analyse de contenu thématique a été effectuée pour les données qualitatives.
Results: Les infirmières ont utilisé l'algorithme pour 34 sur 100 patients éligibles. Un total de 39 infirmières sur 91 a répondu au sondage. Les barrières à l'utilisation les plus fréquemment évoquées sont le manque de temps et la charge de travail trop lourde. L'absence de lignes directrices claires concernant la prise en charge lors d'un dépistage positif entraîne un découragement et un sentiment d'impuissance chez les infirmières. Malgré le fait que ces dernières reconnaissent que le délirium est un problème important, en effectuer le dépistage ne semble pas cliniquement prioritaire. Les réponses font ressortir une perception de non-pertinence, d'imposition hiérarchique et de non-respect. Des pistes de solutions ont été proposées, telles que désigner une personne en charge du dépistage et de déterminer des leviers d'action pour la prise en charge des patients en délirium.
Conclusion: La mise en place d'une prise en charge intégrée et structurée à plusieurs niveaux est essentielle pour assurer le succès du dépistage d'un problème multidisciplinaire tel que le délirium chez le patient âgé. Néanmoins, un travail énorme de sensibilisation et d'enseignement reste à faire. Des études futures sont nécessaires afin de mieux cerner les interventions les plus pertinentes, tant au niveau de la gestion qu'au niveau clinique.
Keyword: delirium

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Sincerely,
Kerstin de Wit, MD MSc

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