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CAEP/ACMU 2019 Scientific Abstracts

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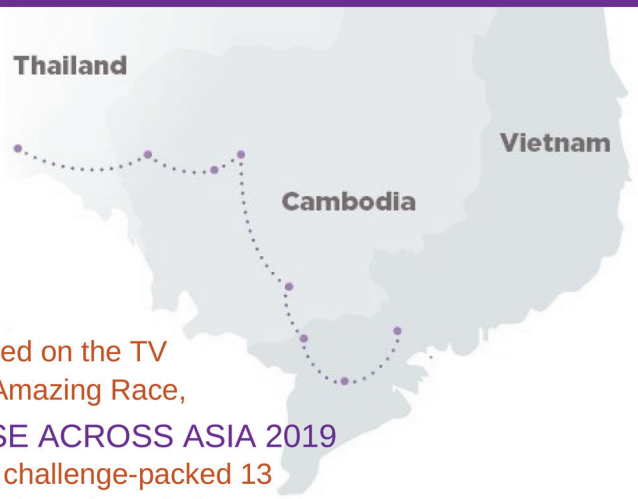

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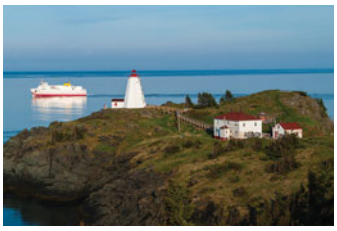

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Canadian Journal of Emergency Medicine Editorial Board

CAEP/ACMU 2019 Scientific Abstracts, May 26th–May 29th, 2019, Halifax, Nova Scotia

Research in emergency medicine (EM) guides improvements in emergency patient care. Research helps to identify and standardize 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 programs: the annual CAEP Grant Competition and CAEP Abstract Competition.

Abstracts are the core of the annual research competition. This year for CAEP 2019 in Halifax, we had 3 submission categories: research, education, and quality improvement and patient safety, as well as several subcategories for quantitative research, qualitative research and education innovation. We received a total of 335 abstracts from EM researchers from across Canada and internationally. The top-ranked abstracts will present at the plenary session, and 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 travel expenses. The promotion and dissemination of high-quality research, like that submitted to the annual CAEP conference, is integral to the enhancement of Canadian EM research.

CAEP has endeavoured to expand its grants program, by launching the EM Advancement Fund (www.TheEMAF.org). With the support of generous donors who consist of our EM colleagues, we provided two grants of $10,000 this year. This year, six CAEP research grants were also awarded for the best proposals submitted by residents, fellows, and junior investigators. CAEP also entered into a new partnership with the Schwartz/Reisman Emergency Medicine Institute (SREMI) and offered two new grants, one for education and one for research. These modest grants are important to the development of EM research and physician-scientists. We hope to continue to expand the grants program and are looking to you for assistance, so remember to support your EM research colleagues through the EM Advancement Fund. We will also be hosting Grizzly Den for the 3rd year. In this highly entertaining track, researchers will "pitch" their research and try to convince the Grizzlies to fund their study for up to $10,000.

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 Scarrow and Kelly Wyatt, 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 2019 Final Program contains the scheduled times for the abstract presentations.

Andrew McRae, MD, PhD, FRCPC
CAEP/ACMU Research Committee Chair

Justin Yan, MD, MSc, FRCPC
CAEP/ACMU Research Committee
Abstract Competition Lead

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

CAEP/ACMU 2019 Research Abstract Awards

First place, Plenary Presentation, Grant Innes Research Paper and Presentation Award
Jeffrey J. Perry
PL01 Prospective multicenter validation of the Canadian TIA score for predicting subsequent stroke within seven days

Second place, Plenary Presentation
Ian Stiell
PL02 A randomized, controlled comparison of electrical versus pharmacological cardioversion for emergency department patients with recent-onset atrial fibrillation

Third place, Plenary Presentation, Top New Investigator Award
Kerstin de Wit
PL03 Prevalence and clinical predictors of intracranial hemorrhage in seniors who have fallen

Fourth place, Plenary Presentation
Simon Berthelot
PL04 Comparison of the cost and the quality of the care provided to low acuity patients in an emergency department and a walk-in clinic

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Top Resident Research Abstract Award
Evan Russell
LO44 Simulation in the continuing professional development of Canadian academic emergency physicians – a national survey

Top Pediatric Abstract Award
Samina Ali
LO63 Humanoid robot-based distraction to reduce pain and distress during venipuncture in the pediatric emergency department: A randomized controlled trial

Top QIPS Abstract Award
Victoria Woolner
LO86 Improving time to analgesia administration for musculoskeletal injuries in the emergency department

Top Medical Student Abstract Award
J. Colin Evans
LO72 Assessing non-technical skills in prehospital ad hoc team resuscitation

Top Education Innovation Abstract Finalists
Alexander Cormier
LO83 Quick Refresher Sessions (QRS): improving chest compression training for medical students

Warren Cheung
LO84 Ready to run the show: development of a new instrument for assessing resident competence in the emergency department

Conor McKaigney
LO85 Development of a competency based assessment tool for emergency department point of care ultrasound

CAEP-CanVECTOR Awards

Vidushi Swarup
LO23 Identifying patient values and expectations for pulmonary embolism CT scanning in the emergency department

Leila Salehi
P113 Variability in utilization and diagnostic yield of Computed Tomography (CT) scans for pulmonary embolism among emergency physicians

CAEP Resident Research Abstract Awards

Erica Lee
LO74 Exploring emergency physicians' ability to predict patient admission and decrease consultation to admission time

Marie-Pier Lanoue
LO11 Influence of fear of falling on return to emergency department and further falls in community-dwelling elderly presenting for minor trauma

Sachin Trivedi
LO61 A national needs assessment on quality improvement and patient safety education in Canadian emergency medicine residency programs

Jake Hayward
LO29 Unexplained variation in 'To-Go' opioid prescribing across emergency departments in a large Canadian cohort

Christopher Byrne
LO64 The HEART score in predicting major adverse cardiac events in patients presenting to the emergency department with possible acute coronary syndrome: a systematic review and meta-analysis

Jessica McCallum
LO66 Solid organ donation from the emergency department – A death review

Scott Odorizzi
LO55 Signal & noise – do professionalism concerns impact decision-making of competence committees?

CAEP/ACMU 2019 Grant Awards

2018 Grizzly Den Grant Awardee
Shannon Fernando
The impact of frailty on outcomes in emergency department patients with sepsis – a feasibility trial

2019 EMAF Grant Awardees
Keerat Grewal
Intracranial BLEEDing after head injury among anticoagulated elderly patients seen in the emergency department (IBLEED-ED): A population-based cohort study

Jake Hayward
Impact of emergency department opioid prescribing on substance misuse & health outcomes

CAEP-SREMI Grants
Brett Burstein
Understanding parental preferences for shared decision-making in the management of febrile young infants

Fareen Zaver
Identifying challenges in the transition from residency to independent practice: a longitudinal comparison of Emergency Medicine and Internal Medicine physicians

2019 Junior Investigator Awardees
Jennifer Chao
Low dose intravenous ketorolac in renal colic: a pilot study to plan a randomized controlled trial

Michael Hale
Residency selection in emergency medicine: a national program director and medical student survey

Kaif Pardhan
Perceptions of assessment and feedback: hawks, doves and impact on learning

Catherine Patocka
Does a 72-hour re-admission alert notification foster physician reflection? A mixed methods realist evaluation

Justine Soucy-Legault
Les bêtabloquants en réanimation cardiorespiratoire : une revue systématique

Justin Yan
A qualitative study to explore the patient experience with emergency department visits for hyperglycemia

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

*Corresponding authors are underlined.

Plenary Oral Presentations

PL01

Prospective multicenter validation of the Canadian TIA Score for predicting subsequent stroke within seven days

J. Perry, MD, MSc, M. Sivilotti, MD, MSc, M. Emond, MD, MSc, A. Worster, MD, MSc, J. Lee, MD, MSc, J. Morris, MD, G. Stotts, MD, G. Wells, PhD, I. Stiell, MD, MSc, K. Cheung, MD, N. Chagnon, MD, H. Murray, MD, MSc, M. Sharma, MD, MSc, University of Ottawa, Department of Emergency Medicine, Ottawa, ON

Introduction: Individualizing risk for stroke following a transient ischemic attack (TIA) is a topic of intense research, as existing scores are context-dependent or have not been well validated. The Canadian TIA Score stratifies risk of subsequent stroke into low, moderate and high risk. Our objective was to prospectively validate the Canadian TIA Score in a new cohort of emergency department (ED) patients. **Methods**: We conducted a prospective cohort study in 14 Canadian EDs over 4 years. We enrolled consecutive adult patients with an ED visit for TIA or nondisabling stroke. Treating physicians recorded standardized clinical variables onto data collection forms. Given the ability of prompt emergency carotid endarterectomy (CEA) to prevent stroke (NNT = 3) in high risk patients, our primary outcome was the composite of subsequent stroke or CEA ≤7 days. We conducted telephone follow-up using the validated Questionnaire for Verifying Stroke Free Status at 7 and 90 days. Outcomes were adjudicated by panels of 3 local stroke experts, blinded to the index ED data collection form. Based on prior work, we estimated a sample size of 5,004 patients including 93 subsequent strokes, would yield 95% confidence bands of +/− 10% for sensitivity and likelihood ratio (LR). Our analyses assessed interval LRs (iLR) with 95% CIs. **Results**: We prospectively enrolled 7,569 patients with mean 68.4 +/−14.7 years and 52.4% female, of whom 107 (1.4%) had a subsequent stroke and 74 (1.0%) CEA ≤7 days (total outcomes = 181). We enrolled 81.2% of eligible patients; missed patients were similar to enrolled. The Canadian TIA Score stratified the stroke/CEA ≤7days risk as: Low (probability <0.2%, iLR 0.20 [95%CI 0.091-0.44]; Moderate (probability 1.3%, iLR 0.79 [0.68-0.92]; High (probability 2.6%, iLR 2.2 [1.9-2.6]. Sensitivity analysis for just stroke ≤7 days yielded similar results: Low iLR 0.17 [95%CI 0.056-0.52], Medium iLR 0.89 [0.75-1.1], High iLR 2.0 [1.6-2.4]. **Conclusion**: The Canadian TIA Score accurately identifies TIA patients risk for stroke/CEA ≤7 days. Patients classified as low risk can be safely discharged following a careful ED assessment with elective follow-up. Patients at moderate risk can undergo additional testing in the ED, have antithrombotic therapy optimized, and be offered early stroke specialist follow-up. Patients at high risk should in most cases be fully investigated and managed ideally in consultation with a stroke specialist during their index ED visit.

Keywords: risk scale, stroke, transient ischemic attack

PL02

A randomized, controlled comparison of electrical versus pharmacological cardioversion for emergency department patients with recent-onset atrial fibrillation

I. Stiell, MD, MSc, J. Perry, MD, MSc, D. Birnie, MD, L. Macle, MD, A. Vadeboncoeur, MD, V. Thiruganasambandamoorthy, MD, MSc, B. Borgundvaag, MD, PhD, R. Brison, MD, MPH, C. Hohl, MD, A. McRae, MD, PhD, B. Rowe, MD, MSc, M. Sivilotti, MD, J. Morris, MD, E. Mercier, MD, C. Clement, J. Brinkhurst, M. Taljaard, PhD, G. Wells, PhD, University of Ottawa, Department of Emergency Medicine, Ottawa, ON

Introduction: For rhythm control of acute atrial fibrillation (AAF) in the emergency department (ED), choices include initial drug therapy or initial electrical cardioversion (ECV). We compared the strategies of pharmacological cardioversion followed by ECV if necessary (Drug-Shock), and ECV alone (Shock Only). **Methods**: We conducted a randomized, blinded, placebo-controlled trial (1:1 allocation) comparing two rhythm control strategies at 11 academic EDs. We included stable adult patients with AAF, where onset of symptoms was <48 hours. Patients underwent central web-based randomization stratified by site. The Drug-Shock group received an infusion of procainamide (15mg/kg over 30 minutes) followed 30 minutes later, if necessary, by ECV at 200 joules x 3 shocks. The Shock Only group received an infusion of saline followed, if necessary, by ECV x 3 shocks. The primary outcome was conversion to sinus rhythm for ≥30 minutes at any time following onset of infusion. Patients were followed for 14 days. The primary outcome was evaluated on an apriori-specified modified intention-to-treat (MITT) basis excluding patients who never received the study infusion (e.g. spontaneous conversion). Data were analyzed using chi-squared tests and logistic regression. Our target sample size was 374 evaluable patients. **Results**: Of 395 randomized patients, 18 were excluded from the MITT analysis; none were lost to follow-up. The Drug-Shock (N = 198) and Shock Only (N = 180) groups (total = 378) were similar for all characteristics including mean age (60.0 vs 59.5 yrs), duration of AAF (10.1 vs 10.8 hrs), previous AF (67.2% vs 68.3%), median CHADS2 score (0 vs 0), and mean initial heart rate (119.9 vs 118.0 bpm). More patients converted to normal sinus rhythm in the Drug-Shock group (97.0% vs 92.2%; absolute difference 4.8%, 95% CI 0.2-9.9; P = 0.04). The multivariable analyses confirmed the Drug-Shock strategy superiority (P = 0.04). There were no statistically significant differences for time to conversion (91.4 vs 85.4 minutes), total ED length of stay (7.1 vs 7.7 hours), disposition home (97.0% vs 96.1%), and stroke within 14 days (0 vs 0). Premature discontinuation of infusion was more common in the Drug-Shock group (8.1% vs 0.6%) but there were no serious adverse events. **Conclusion**: Both the Drug-Shock and Shock Only strategies were highly effective and safe in allowing AAF patients to go home in sinus rhythm. A strategy of initial cardioversion with procainamide was superior to a strategy of immediate ECV.

Keywords: atrial fibrillation, cardioversion

PL03

Prevalence and clinical predictors of intracranial hemorrhage in seniors who have fallen

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Introduction: The Canadian population is aging and an increasing proportion of emergency department (ED) patients are seniors. ED

visits among seniors are frequently instigated by a fall at home. Some of these patients develop intracranial hemorrhage (ICH) because of falling. There has been little research on the frequency of ICH in elderly patients who fall, and on which clinical factors are associated with ICH in these patients. The aim of this study was to identify the incidence of ICH, and the clinical features which are associated with ICH, in seniors who present to the ED having fallen. **Methods**: This was a prospective cohort study conducted in three EDs. Patients were included if they were age >65 years, and presented to the ED within 48 hours of a fall on level ground, off a bed/chair/toilet or down one step. Patients were excluded if they fell from a height, were knocked over by a vehicle or were assaulted. ED physicians recorded predefined clinical findings (yes/no) before any head imaging was done. Head imaging was done at the ED physician's discretion. All patients were followed for 6 weeks (both by telephone call and chart review at 6 weeks) for evidence of ICH. Associations between baseline clinical findings and the presence of ICH were assessed with multivariable logistic regression. **Results**: In total, 1753 patients were enrolled. The prevalence of ICH was 5.0% (88 patients), of whom 74 patients had ICH on the ED CT scan and 14 had ICH diagnosed during follow-up. 61% were female and the median age was 82 (interquartile range 75-88). History included hypertension in 76%, diabetes in 29%, dementia in 27%, stroke/TIA in 19%, major bleeding in 11% and chronic kidney disease in 11%. 35% were on antiplatelet therapy and 25% were on an anticoagulant. Only 4 clinical variables were independently associated with ICH: bruise/laceration on the head (odds ratio (OR): 4.3; 95% CI 2.7-7.0), new abnormalities on neurological examination (OR: 4.4; 2.4-8.1), chronic kidney disease (OR: 2.4; 1.3-4.6) and reduced GCS from baseline (OR: 1.9; 1.0-3.4). Neither anticoagulation (OR: 0.9; 0.5-1.6) nor antiplatelet use (OR: 1.1; 0.6-1.8) appeared to be associated with ICH. **Conclusion**: This prospective study found a prevalence of ICH of 5.0% in seniors after a fall, and that bruising on the head, abnormal neurological examination, abnormal GCS and chronic kidney disease were predictive of ICH.
Keywords: intracranial hemorrhage, predictors, seniors

PL04

Comparison of the cost and the quality of the care provided to low acuity patients in an emergency department and a walk-in clinic

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Introduction: Low acuity patients have been controversially tagged as a source of emergency department (ED) misuse. Authorities for many Canadian health regions have set up policies so these patients preferably present to walk-in clinics (WIC). We compared the cost and quality of the care given to low acuity patients in an academic ED and a WIC of Québec City during fiscal year 2015-16. **Methods**: We conducted an ambidirectional (prospective and retrospective) cohort study using a time-driven activity-based costing method. This method uses duration of care processes (e.g., triage) to allocate to patient care all direct costs (e.g., personnel, consumables), overheads (e.g., building maintenance) and physician charges. We included consecutive adult patients, ambulatory at all time and discharged from the ED or WIC with a diagnosis of upper respiratory tract infection (URTI), urinary tract infection (UTI) or low back pain. Mean cost [95%CI] per patient per condition was compared between settings after risk-adjustment for age, sex, vital signs, number of regular medications and co-morbidities using generalized log-gamma regression models. Proportions [95% CI] of antibiotic prescription and chest X-Ray use in URTI, compliance with provincial guidelines on use of antibiotics in UTI, and column X-Ray use in low back pain were compared between settings using a Pearson Chi-Square test. **Results**: A total of 409 patients were included. ED and WIC groups were similar in terms of age, sex and vital signs on presentation, but ED patients had a greater burden of comorbidities. Adjusted mean cost (2016 CAN$) of care was significantly higher in the ED than in the WIC ($p < 0.0001$) for URTI (78.42[64.85-94.82] vs. 59.43[50.43-70.06]), UTI (78.88 [69.53-89.48] vs. 53.29[43.68-65.03]), and low back pain (87.97 [68.30-113.32] vs. 61.71[47.90-79.51]). For URTI, antibiotics were more frequently prescribed in the WIC (44.1%[34.3-54.3] vs. 5.8% [1.2-16.0]; $p < 0.0001$) and chest X-Rays, more frequently used in the ED (26.9%[15.6-41.0] vs. 13.7%[7.7-22.0]; $p = 0.05$). No significant differences were observed in the compliance with guidelines on use of antibiotics in UTI and in the use of column X-Ray in low back pain. **Conclusion**: Total cost of care for low acuity patients is lower in walk-in clinics than in EDs. However, our results suggest that quality-of-care issues should be considered in determining the best alternate setting for treating ambulatory emergency patients.
Keywords: healthcare costs, low-acuity patients, quality of healthcare

Oral Presentations

LO01

Development and validation of an adjustment score for ruling out MI using a single high-sensitivity cardiac troponin T assay in patients with chest pain and kidney dysfunction

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Introduction: Very low concentrations of high-sensitivity cardiac troponin can rule-out myocardial infarction (MI) at ED arrival in patients with chest pain. However, this single troponin rule-out strategy works poorly in patients with renal impairment and elevated baseline troponin levels. The objective of this study was to develop and validate a troponin adjustment strategy to accurately rule-out MI with a single hs-cTnTmeasurement in patients with kidney dysfunction. **Methods**: We used data from three cohorts of ED chest pain patients to develop an adjustment score for a high-sensitivity troponin T (hs-cTnT) assay in patients with kidney dysfunction. The derivation cohort (n = 8846) used administrative and registry data. Two validation cohorts (n = 1187 and 1092) were prospectively-collected. The score assigned points for increasing hs-cTnT levels and subtracted points for lower estimated glomerular filtration rate (eGFR). In the derivation cohort, hs-cTnT concentrations achieving 98.5% sensitivity in of patients with eGFR ≥60, 45-59, 30-44, 15-29 and <15 were assigned ascending positive integer values. Negative integer values were assigned to eGFR values 45-59, 30-44, 15-29 and <15. The scpres for troponin and eGFR were summed for each patient, with scores ranging from −4 to +5. The proportion of patients with 7-day MI ruled out by a score ≤0, sensitivity, NPV, negative likelihood ratio (LR-) and area under the curve (AUC) were quantified

in each study cohort. **Results**: The derivation and validation cohorts had 7-day MI rates of 5.7, 8.6 and 9.1%. In the derivation cohort, a score ≤0 ruled out MI in 35% of patients, with a sensitivity for 7-day MI of 99.5% (95% CI 98-100), NPV of 99.9% (95% CI 98.4-99.9), LR- of 0.02 (95% CI 0.01-0.05) and AUC of 0.88. In the first validation cohort, a score ≤0 ruled out MI in 45% of patients, with a sensitivity for 7-day MI of 97% (95% CI 90-100%), NPV of 99% (95% CI 98-100%), LR- 0.06 (0.02-0.18) and AUC of 0.89. In the second validation cohort, a score ≤0 ruled out MI in 20% of patients, with a sensitivity for 7-day MI of 96% (95% CI 93-99%), NPV of 98% (95% CI 96-100%), LR- of 0.16 (95% CI 0.07-0.39) and AUC of 0.78. **Conclusion**: We developed and validated a simple scoring system to adjust hs-cTnT concentrations for a patient's kidney function that enables MI to be ruled out in a large proportion of chest pain patients using a single measurement on ED presentation.
Keywords: kidney disease, myocardial infarction, troponin

LO02

Development of the HEARTRISK6 Scale for emergency department patients with acute heart failure

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Introduction: We previously derived (N = 559) and validated (N = 1,100) the 10-item Ottawa Heart Failure Risk Scale (OHFRS), to assist with disposition decisions for patients with acute heart failure (AHF) in the emergency department (ED). In the current study we sought to use a larger dataset to develop a more concise and more accurate risk scale. **Methods**: We analyzed data from the prior two studies and from a new cohort. For all 3 groups we conducted prospective cohort studies that enrolled patients who required treatment for AHF at 8 tertiary care hospital EDs. Patients were followed for 30 days. The primary outcome was short-term serious outcome (SSO), defined as death within 30 days, intubation or non-invasive ventilation (NIV) after admission, myocardial infarction, or relapse resulting in hospital admission within 14 days. The fully pre-specified logistic regression model with 13 predictors (where age, pCO2, and SaO2 were modeled using spline functions) was fitted to 10 multiple imputation datasets. Harrell's fast stepdown procedure reduced the number of variables. We calculated the potential impact on sensitivity (95% CI) for SSO and hospital admissions, and estimated a sample size of 2,000 patients. **Results**: The 1,986 patients had mean age 77.3 years, male 54.1%, EMS arrival 41.2%, IV NTG 3.3%, ED NIV 5.4%, admission on initial visit 49.5%. Overall there were 236 (11.9%) SSOs including 61 deaths (3.1%), meaning that current admission practice sensitivity for SSO was only 59.7%. The final HEARTRISK6 scale is comprised of 6 variables (points) (C-statistic 0.68): Valvular heart disease (2) Antiarrhythmic medication (2) ED non-invasive ventilation (3) Creatinine 80–150 (1); ≥150 (3) Troponin ≥3x URL (2) Walk test failed (1). The probability of SSO ranged from 4.8% for a total score of 0 to 62.4% for a score of 10, showing good calibration. Choosing a HEARTRISK6 total point admission threshold of ≥3 would yield sensitivity of 70.8% (95%CI 64.5-76.5) for SSO with a slight decrease in admissions to 47.9%. Choosing a threshold of ≥2 would yield a sensitivity of 84.3% (95%CI 79.0-88.7) but require 66.6% admissions. **Conclusion**: Using a large prospectively collected dataset, we created a more concise and more sensitive risk scale to assist with admission decisions for patients with AHF in the ED. Implementation of the HEARTRISK6 scale should lead to safer and more efficient disposition decisions, with more high-risk patients being admitted and more low-risk patients being discharged.
Keywords: heart failure, risk scale, safety

LO03

Validation of The Ottawa Troponin Pathway

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Introduction: Our team developed "The Ottawa Troponin Pathway" (OTP) for Non-ST Elevation Myocardial Infarction (NSTEMI) diagnosis using serial conventional troponin (cTnI) 3 hours apart to aid in safe and early disposition of ED patients. The primary objective of this study is to validate the diagnostic accuracy of the OTP in the cohort of patients with cTnI values above the 99th percentile (>45ng/L). **Methods**: This study is a health records review conducted at the Civic and General Campuses of The Ottawa Hospital from August 2017 to December 2017. Adults (≥18 years) who presented to the ED with symptoms of ACS, and who had serial cTnI (at least two values 3 hours ±15 minutes apart) performed for diagnosis of NSTEMI and at least one cTnI value >45ng/L were included. Patients with cardiac arrest, STEMI, unstable angina or those with TnI values ≤45ng/L were excluded. The outcomes were death due to unknown cause or NSTEMI adjudicated by two blinded investigators within 30 days. Data collected include baseline characteristics, ED management, length of stay, cTnI values and times of measurement, disposition, and outcome. We used descriptive statistics and test diagnostic characteristics to analyze our data. **Results**: We screened 53,077 patients, of whom 635 patients were included in the study (mean age 71.6 years; 57.6% males; 59.7% hospitalized; median ED length of stay 4.7 hours.). 107 patients (16.9%; 95%CI 14.1%-20.0%) were diagnosed with NSTEMI within 30 days. Among patients with TNI values above the 99th percentile, the OTP did not miss any patients diagnosed with NSTEMI. The sensitivity and the specificity of the OTP were 100% (95%CI 96.6%-100%) and 32.2% (95%CI 28.2%-36.4%) respectively. **Conclusion**: Our results show that the OTP is diagnostically accurate in ruling out NSTEMI among patients with cTNI values above the 99th percentile with symptoms concerning for ACS. Using the OTP will allow for early referral to consulting services for management, safe and early discharge home, and improve ED crowding.
Keywords: chest pain, non-ST elevated myocardial infarction (NSTEMI), troponin

LO04

Canadian best practice diagnostic algorithm for acute aortic syndrome

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Introduction: Acute aortic syndrome (AAS) is a time sensitive aortic catastrophe that is often misdiagnosed. There are currently no

Canadian guidelines to aid in diagnosis. Our goal was to adapt the existing American Heart Association (AHA) and European Society of Cardiology (ESC) diagnostic algorithms for AAS into a Canadian evidence based best practices algorithm targeted for emergency medicine physicians. **Methods**: We chose to adapt existing high-quality clinical practice guidelines (CPG) previously developed by the AHA/ESC using the GRADE ADOLOPMENT approach. We created a National Advisory Committee consisting of 21 members from across Canada including academic, community and remote/rural emergency physicians/nurses, cardiothoracic and cardiovascular surgeons, cardiac anesthesiologists, critical care physicians, cardiologist, radiologists and patient representatives. The Advisory Committee communicated through multiple teleconference meetings, emails and a one-day in person meeting. The panel prioritized questions and outcomes, using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach to assess evidence and make recommendations. The algorithm was prepared and revised through feedback and discussions and through an iterative process until consensus was achieved. **Results**: The diagnostic algorithm is comprised of an updated pre test probability assessment tool with further testing recommendations based on risk level. The updated tool incorporates likelihood of an alternative diagnosis and point of care ultrasound. The final best practice diagnostic algorithm defined risk levels as Low (0.5% no further testing), Moderate (0.6-5% further testing required) and High (>5% computed tomography, magnetic resonance imaging, trans esophageal echocardiography). During the consensus and feedback processes, we addressed a number of issues and concerns. D-dimer can be used to reduce probability of AAS in an intermediate risk group, but should not be used in a low or high-risk group. Ultrasound was incorporated as a bedside clinical examination option in pre test probability assessment for aortic insufficiency, abdominal/thoracic aortic aneurysms. **Conclusion**: We have created the first Canadian best practice diagnostic algorithm for AAS. We hope this diagnostic algorithm will standardize and improve diagnosis of AAS in all emergency departments across Canada.

Keywords: guidelines, acute aortic syndrome, diagnostic algorithm

LO05

Influence du délai avant le retour de circulation spontanée sur la survie des patients souffrant d'un arrêt cardiaque extrahospitalier

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Introduction: Parmi les patients souffrant d'un arrêt cardiaque extrahospitalier (ACEH), ceux ayant un retour de circulation spontanée (RCS) durant la phase préhospitalière de leur réanimation ont un meilleur taux de survie. Il est plausible que les patients ayant un RCS plus précocement durant leur réanimation préhospitalière aient de meilleur taux de survie que les patients ayant un RCS plus tardif. Cette étude visait à décrire l'association entre la survie et la durée de la réanimation par les paramédics avant le RCS préhospitalier. **Methods**: La présente étude de cohorte a été réalisée à partir des bases de données collectées de la Corporation d'Urgences-santé dans la région de Montréal entre 2010 et 2015. Tous les patients adultes avec un RCS préhospitalier suite à un ACEH d'origine médicale ont été inclus. Les patients ayant eu un arrêt devant les paramédics ont été exclus, tout comme ceux avec un RCS avant l'arrivée des services préhospitaliers. L'association entre la survie et le temps de réanimation avant le RCS a été évaluée à l'aide d'une régression logistique multivariée ajustant pour les variables sociodémographiques et cliniques pertinentes (âge, sexe, rythme initial, heure de l'appel initial, arrêt témoigné, manœuvre par témoin, présence de premiers répondants ou de paramédics de soins avancés, délai avant l'arrivée des intervenants préhospitaliers). **Results**: Un total de 1194 patients (818 hommes et 376 femmes) d'un âge moyen de 64 ans (±17) ont été inclus dans l'étude, parmi lesquels 433 (36%) ont survécu jusqu'à leur congé hospitalier. Le délai moyen avant leur RCS était de 17 minutes (±12). Nous avons observé une association indépendante entre la survie au congé hospitalier et le délai avant le RCS préhospitalier (rapport de cotes ajusté = 0,91 [intervalle de confiance à 95% 0,89-0,92], $p < 0,001$). Plus de 50% des survivants avaient obtenu un RCS moins de 9 minutes après l'initiation des manœuvres de réanimation par les intervenants préhospitaliers, et plus de 95% avant 26 minutes. Aucun (0%) des 17 patients ayant eu un RCS plus de 56 minutes après l'initiation de la réanimation préhospitalière n'a survécu. **Conclusion**: Un RCS précoce semble être un facteur de bon pronostic parmi les patients souffrant d'un ACEH. La majorité des patients avec un RCS préhospitalier allant survivre à leur hospitalisation ont obtenus leur RCS dans les 9 minutes suivant l'initiation des manœuvres de réanimation.

Keywords: out-of-hospital cardiac arrest, prehospital return of spontaneous circulation, prognosis

LO06

Évolution du rythme en fonction du délai avant l'initiation des manœuvres de réanimation chez des patients souffrant d'un arrêt cardiaque extrahospitalier

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Introduction: Les patients dont l'arrêt cardiaque extrahospitalier (ACEH) n'a pas été témoigné sont généralement exclus des protocoles de réanimation par circulation extracorporelle puisque le délai avant l'initiation de leur réanimation est inconnu. Il a été proposé que la présence d'un rythme initial défibrillable (RD) est fortement suggestif une très courte période avant l'initiation des manœuvres de réanimation. La présente étude vise à décrire l'association entre la durée avant l'initiation de la réanimation et la présence d'un RD chez des patients souffrant d'un ACEH. **Methods**: Cette étude de cohorte a été réalisée à partir des bases de données collectées de la Corporation d'Urgences-santé dans la région de Montréal entre 2010 et 2015. Les patients dont l'arrêt était témoigné, mais dont les témoins n'ont pas entamé de manœuvres de réanimation, ont été inclus. Nous avons également inclus les patients dont l'arrêt était témoigné par les paramédics comme groupe contrôle (durée avant l'initiation de la réanimation = 0 minute). Les patients avec un retour de circulation spontanée avant l'arrivée des services préhospitaliers ont été exclus, tout comme ceux dont le rythme initial était inconnu. Nous avons décrit l'évolution de la proportion de chacun des rythmes et construit une

régression logistique multivariée ajustant pour les variables sociodémographiques et cliniques pertinentes. **Results**: Un total de 1751 patients (1173 hommes et 578 femmes) d'un âge moyen de 69 ans (±16) ont été inclus dans l'analyse principale, parmi lesquels 603 (34%) avaient un RD. Un total de 663 autres patients ont vu leur ACEH témoigné directement par les paramédics. Un plus court délai avant l'initiation des manœuvres est associé à la présence d'un RD (rapport de cotes ajusté = 0,97 [intervalle de confiance à 95% 0,94-0,99], p = 0,016). Cependant, cette relation n'est pas linéaire et la proportion de RD ne diminue pas avant notablement jusqu'à ce que 15 minutes s'écoulent avant le début de la réanimation (0 min = 35%, 1-5 min = 37%, 5-10 min = 35%, 10-15 min = 34%, +de 15 min = 16%). **Conclusion**: Bien que la proportion de patients avec un RD diminue lorsque le délai augmente avant l'initiation des manœuvres, cette relation ne semble pas linéaire. La baisse principale de la proportion de patients avec RD semble se produire suite à la quinzième minute de délai avant le début de la réanimation.

Keywords: cardiac rhythm, no-flow time, out-of-hospital cardiac arrest

LO07

Double sequential external defibrillation improves termination of ventricular fibrillation and return of spontaneous circulation in shock-refractory out-of- hospital cardiac arrest

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Introduction: Despite significant advances in resuscitation efforts, there are some patients who remain in ventricular fibrillation (VF) after multiple shocks during out-of-hospital cardiac arrest (OHCA). Double sequential external defibrillation (DSED) has been proposed as a treatment option for patients in shock refractory VF. We sought to compare DSED to standard therapy with regards to VF termination and return of spontaneous circulation (ROSC) for patients presenting in shock refractory VF. **Methods**: We performed a retrospective review of all treated adult OHCA who presented in VF and received a minimum of three successive shocks over a two year period beginning on Jan 1, 2015 in four Canadian EMS agencies. Using ambulance call reports and defibrillator files, we compared VF termination (defined as the absence of VF at the rhythm check following defibrillation and 2 minutes of CPR) and VF termination into a perfusing rhythm with ROSC between patients who received standard therapy (CPR, defibrillation, epinephrine and antiarrhythmics) and those who received DSED (after on-line medical consultation) for shock refractory VF. Cases of traumatic cardiac arrest and those who presented in VF but terminated VF prior to 3 successive shocks were excluded. **Results**: Among 197 patients who met the study criteria for shock refractory VF, 161 (81.7%) patients received standard therapy and 36 (18.3%) received DSED. For the primary outcome, VF termination was significantly higher for DSED compared to standard therapy (63.9% vs 18.0%; Δ45.9%; 95% CI: 28.3 to 60.5). For the secondary outcome of VF termination into ROSC, DSED was associated with significantly higher ROSC compared to standard care (33.3% vs 13%; Δ20.3%; 95% CI:13.0 to 33.3). The median (IQR) number of failed standard shocks prior to DSED was 8 (6, 10). When DSED terminated VF, it did so with a single DSED shock in 69.6% of cases. **Conclusion**: Our observational findings suggest improved VF termination and ROSC are associated with DSED compared to standard therapy for shock refractory VF. An appropriately powered randomized controlled trial is required to assess the impact of DSED on patient-important outcomes.

Keywords: cardiopulmonary resuscitation, double sequential external defibrillation, refractory ventricular fibrillation

LO08

Defibrillation energy dose during pediatric cardiac arrest: systematic review of human and animal model studies

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Introduction: Prompt defibrillation is critical during paediatric cardiac arrest. The main objective of this systematic review was to determine the initial defibrillation energy dose for ventricular fibrillation (VF) or pulseless ventricular tachycardia (pVT) that is associated with sustained return of spontaneous circulation (ROSC) during paediatric cardiac arrest. Associations between initial defibrillation energy dose with any ROSC, survival and defibrillation-induced complications were also assessed. **Methods**: A systematic review was performed using four databases (Medline, Embase, Web of Science, Cochrane Library) (PROSPERO: CRD42016036734). Human studies (cohort studies or controlled trials) and animal model studies (controlled trials) of pediatric cardiac arrest involving assessment of external defibrillation energy dosing were considered. The primary outcome was sustained ROSC. Two researchers independently reviewed all the titles and abstracts of the retrieved citations, selected the studies and extracted the data using a standardized template. Risk of bias of human non-randomised studies were assessed using the ROBIN-I tool (formerly ACROBAT-NRSI) tool proposed by the Cochrane Collaboration group. **Results**: The search strategy identified 14,471 citations of which 232 manuscripts were reviewed. Ten human and 10 animal model studies met the inclusion criteria. Human studies were prospective (n = 6) or retrospective (n = 4) cohort studies and included between 11 and 266 patients (median = 46 patients). Sustained ROSC rates ranged from 0 to 61% (n = 7). No studies reported a statistically significant association between the initial defibrillation energy dose and the rate of sustained ROSC (n = 7) or survival (n = 6). No human studies reported defibrillation-induced complications. Meta-analysis was not considered appropriate due to clinical heterogeneity. The overall risk of bias was moderate. All animal studies were randomized controlled trials with 8 and 52 (median = 27) piglets. ROSC was frequently achieved (more than 85%) with energy dose ranging from 2 to 7 joules/kg (n = 7). The defibrillation threshold varied according to the body weight and appears to be higher in infant models. **Conclusion**: Defibrillation energy doses and thresholds varied according to the body weight and trended higher for infants. No definitive association between initial defibrillation doses and the outcomes of sustained ROSC or survival could be demonstrated.

Keywords: cardiac arrest, defibrillation, pediatric

LO09

Variation entre les taux de retour de circulation spontané préhospitalier et les délais de réanimation avant ceux-ci en fonction du rythme initial chez les patients souffrant d'un arrêt cardiaque extrahospitalier

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Introduction: Les patients ayant un retour de circulation spontanée (RCS) durant la phase préhospitalière de leur réanimation suite à un arrêt cardiaque extrahospitalier (ACEH) ont un meilleur taux de survie que ceux n'en ayant pas. La durée des efforts de réanimation avant l'initiation d'un transport ne varie généralement pas en fonction du rythme initial observé. Cette étude vise à comparer la durée des manœuvres de réanimation nécessaire afin de générer la majorité des RCS préhospitaliers et des RCS préhospitaliers menant à une survie en fonction du rythme initial. **Methods**: La présente étude de cohorte a été réalisée à partir des bases de données collectées de la Corporation d'Urgences-santé dans la région de Montréal entre 2010 et 2015. Les patients avec un ACEH d'origine médicale ont été inclus. Les patients dont l'ACEH était témoigné par les paramédics ont été exclus, tout comme ceux dont le rythme initial était inconnu. Nous avons comparé entre les groupes (rythme défibrillable [RD], activité électrique sans pouls [AESP] et asystolie) les taux de RCS préhospitalier et le temps nécessaires pour obtenir une majorité des RCS préhospitaliers et des RCS préhospitaliers menant à une survie. **Results**: Un total de 6002 patients (3851 hommes et 2151 femmes) d'un âge moyen de 52 ans (±10) ont été inclus dans l'étude, parmi lesquels 563 (9%) ont survécu jusqu'à leur congé hospitalier et 1310 (22%) ont obtenu un RCS préhospitalier. Un total de 1545 (26%) patients avaient un RD, 1654 (28%) une AESP et 2803 (47%) une asystolie. Les patients avec un RD ont obtenu plus fréquemment un RCS préhospitalier et un RCS préhospitalier menant à une survie que les patients avec une AESP qui eux même avaient un meilleur pronostic que ceux avec une asystolie initial (777 patients [55%] vs 385 [23%] vs 148 [5%], $p < 0{,}001$; 431 [28%] vs 85 [5%] vs 7 [0,2%], $p < 0{,}001$, respectivement). Les RCS survenaient également plus rapidement lorsque le rythme initial était un RD (13 minutes [±12] vs 18 [±13] vs 25 [±12], $p < 0{,}001$). Cependant, une période de réanimation plus longue était nécessaire afin d'obtenir 95% des RCS préhospitaliers menant à une survie pour les patients avec un RD (26 minutes vs 21 minutes vs 21 minutes). **Conclusion**: Les patients avec un rythme initial défibrillable suite à leur ACEH sont à meilleur pronostic. Il serait envisageable de transporter plus rapidement vers l'hôpital les patients avec une AESP ou une asystolie que ceux avec un rythme défibrillable si l'arrêt des manœuvres n'est pas envisagé.

Keywords: cardiac rhythm, out-of-hospital cardiac arrest, return of spontaneous circulation

LO10

Associations between ED crowding metrics and 72h-hour ED re-visits: Which crowding metrics are most highly associated with patient-oriented adverse outcomes?

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Introduction: Emergency Department (ED) crowding is a pervasive problem and is associated with adverse patient outcomes. Yet, there are no widely accepted, universal ED crowding metrics. The objective of this study is to identify ED crowding metrics with the strongest association to the risk of ED revisits within 72 hours, which is a patient-oriented adverse outcome. **Methods**: Crowding metrics, patient characteristics and outcomes were obtained from administrative data for all ED encounters from 2011-2014 for three adult EDs in Calgary, AB. The data were randomly divided into three partitions for cross-validation, and further divided by CTAS category 1, 2/3 and 4/5. Twenty unique ED crowding metrics were calculated and assigned to each patient seen on each calendar day or shift, to standardize the exposure. Logistic regression models were fitted with 72h ED revisit as the dependent variable, and an individual crowding metric along with a common list of confounders as independent variables. Adjusted odds ratios (OR) for the 72h return visits were obtained for each crowding metric. The strength of associations between 72h revisits and crowding metrics were compared using Akaike's Information Criterion and Akaike weights. **Results**: This analysis is based on 1,149,939 ED encounters. Across all CTAS groups, INPUT metrics (ED census, ED occupancy, waiting time, EMS offload delay, LWBS%) were only weakly associated with the risk of 72h re-visit. Among THROUGHPUT metrics, ED Length of Stay and MD Care Time had similar adjusted ORs for 72h ED re-visit (range 0.99-1.15). Akaike weights ranging from 0.3/1.00 to 0.4/1.00 indicate that both THROUGHPUT metrics are reasonable predictors of 72h ED re-visits. All OUTPUT metrics (boarding time, # of boarded patients, % of beds occupied by boarded patients, hospital occupancy) had statistically significant ORs for 72h ED re-visits. The median boarding time had the highest adjusted OR for 72h ED re-visit (adjusted OR 1.40, 95% CI 1.33-1.47) and highest Akaike weight (0.97/1.00) compared to all other OUTPUT metrics, indicating that median boarding time had the strongest association with 72h re-visits. **Conclusion**: ED THROUGHPUT and OUTPUT metrics had consistent associations with 72h ED re-visits, while INPUT metrics had little to no association with 72h re-visits. Median boarding time is the strongest predictor of 72h re-visits, indicating that this may be the most meaningful measure of ED crowding.

Keywords: emergency department crowding

LO11

Influence of fear of falling on return to emergency department and further falls in community-dwelling elderly presenting for minor trauma

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Introduction: According to WHO, one third of patients aged ≥65 fall every year. Those falls account for 25% of all geriatric emergency department (ED) visits. Fear of falling (FOF) is common in older patients who sustained a fall and is associated with a decline in mobility and health issues for patients. We hypothesized that there is an association between FOF and return to ED (RTED) and future falls. **Objective**: To assess the relation between FOF and RTED and subsequent falls in older ED patients **Methods**: This research was conducted as part of the Canadian Emergency Team Initiative in elderly (CETIe) multicenter prospective cohort study from 2011 to 2016. **Participants**: Patients 65 years or older were assessed and discharged from ED following a minor trauma. They had to be independent in all basic activities of daily living and being able to communicate in English or French. **Measures**: Primary outcome was RTED and secondary outcome was subsequent falls. Both were self-reported at 3 and 6 months. Patients were stratified according

to Short Falls Efficacy Scale International (SFES-I) score, assessing FOF in different situations. A total score is calculated to determine the mild, moderate or severe level of FOF. Previous falls and TUG were used to evaluate patients' mobility. OARS, ISAR and SOF were used to evaluated patient frailty. Descriptive statistical were performed and multiple regression were performed to show the association between SFES-1 score and outcomes. **Results**: FOF was measured in 2899 participants, of which 2214 participated at the 3 months follow-up and 2009 participated at the 6 months follow-up. Odds Ratio (OR) of return to ED at 3 months was 1.10 for moderate FOF and 1.52 for severe FOF (Type 3 test p = 0.11). At 6 months, OR was 1.03 for moderate FOF and 1.25 for severe FOF (Type 3 test p = 0.63). OR of subsequent fall at 3 months was 1.80 for moderate FOF and 2.18 for severe FOF (Type 3 test p < 0.001). At 6 months, OR of subsequent fall was 1.63 for moderate FOF and 2.37 for severe FOF (Type 3 test p < 0.001). **Conclusion**: The multicenter cohort study showed that severe fear of falling is strongly associated with subsequent falls over the next 6 months following ED discharge, but not significantly associated with return to ED episodes. Further research should be done to analyze the association between severe FOF and RTED.

Keywords: community-dwelling elderly, fall, fear of falling

LO12

Efficacy of calcitonin for treating acute pain associated with osteoporotic vertebral compression fracture: an updated systematic review and meta-analysis

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Introduction: Acutely painful osteoporotic vertebral compression fractures (OVCFs) are common in elderly individuals. Most OVCFs result from falls or routine activities, such as lifting objects or bending. OVCFs are associated with increased hospitalization, mortality and reduced quality of life. Calcitonin has been studied as an alternative or adjunct to opioid or non-opioid analgesia for treating acute pain associated with OVCFs. This review evaluates current evidence on the benefits and harms of calcitonin related to OVCFs. **Methods**: We registered our review protocol on PROSPERO (CRD42018084850) and conducted our study in compliance with PRISMA guidelines. We searched MEDLINE, EMBASE, The Cochrane Database of Systematic Reviews, clinical trials registries, conference papers and reference lists of included studies. Eligible studies evaluated the effect of calcitonin on pain scores in adults ≥60 years-old with a recent OVCF (<45 days prior). Two reviewers independently screened studies, extracted data and allocated bias in duplicate. Data were pooled for meta-analysis using standard mean difference (SMD) and a random-effects model. Heterogeneity was evaluated with I2 and sensitivity analyses were performed. The certainty of evidence was assessed with GRADE criteria. Our primary outcome was pain; secondary outcomes include mobility and adverse events. **Results**: 1180 articles were screened, 11 eligible studies were identified and 9 (627 participants) were pooled for meta-analysis. Pain at rest was lower in the calcitonin group than the control group at week 1 (SMD -1.11, 95% confidence interval (CI) -1.95 to -0.26, I2 = 92%). Sensitivity analysis showed that the route of administration influenced this effect: the SMD for calcitonin nasal spray was -1.88 (95% CI -2.31 to -1.44, I2 = 53%) compared to -0.35 (95% CI -0.86 to 0.17, I2 = 60%) for intramuscular injection. Improvements in mobility were observed at week 4 (SMD -0.48, 95% CI -0.79 to -0.17, I2 = 45%). The risk of adverse events was increased with calcitonin (Risk Ratio 2.72, 95% CI 0.90 to 8.17, I2 = 41%) and consisted of flushing, headache, dizziness and gastrointestinal effects. The overall certainty of evidence was downgraded to low due to concerns over risk of bias and inconsistency between studies. **Conclusion**: Calcitonin, particularly as a nasal spray, is beneficial and safe for treating acute pain associated with OVCFs. Further studies are needed to improve the certainty of evidence.

Keywords: back pain, elderly, vertebral fracture

LO13

Characteristics of emergency department visits by community-dwelling older adults who screened positive for elder abuse during home care assessments

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Introduction: Elder abuse is infrequently detected in the emergency department (ED) and less than 2% are reported to proper law authorities by ED physicians. This study aims to examine the characteristics of community-dwelling older adults who screened positive for elder abuse during home care assessments and the epidemiology of ED visits by these patients relative to other home care patients. **Methods**: This study utilized a population-based retrospective cohort study of home care patients in Canada between April 1, 2007 and March 31, 2015. Standardized, comprehensive home care assessments were extracted from the Home Care Reporting System. A positive screen for elder abuse was defined as at least one these criteria: fearful of a caregiver; unusually poor hygiene; unexplained injuries; or neglected, abused, or mistreated. Home care assessments were linked to the National Ambulatory Care Reporting System in the regions and time periods in which population-based estimates could be obtained to identify all ED visits within 6 months of the home care assessment. **Results**: A total of 30,413 from the 2,401,492 patients (1.3%) screened positive for elder abuse during a home care assessment. They were more likely to be male (40.5% versus 35.3%, p < 0.001), to have a cognitive impairment (82.9% versus 65.3%, p < 0.001), a higher frailty index (0.27 versus 0.22, p < 0.001) and to exhibit more depressive symptoms (depression rating scale 1 or more: 68.7% versus 42.7%, p < 0.001). Patient who screened positive for elder abuse were less likely to be independent in activities of daily living (41.9% versus 52.7%, p < 0.001) and reported having fallen more frequently (44.2% versus 35.5%, p < 0.001). Caregiver expressing distress was associated with elder abuse (35.3% versus 18.3%, p < 0.001) but not a higher number of hours caring for the patient. Victims of elder abuse were more likely to attend the ED for low acuity conditions (Canadian triage and acuity scale (CTAS) 4 or 5). Diagnosis at discharge from ED were similar with the exception of acute intoxication that was more frequent in patients who are victims of abuse. **Conclusion**: Elder abuse is infrequently detected during home care assessments in community-dwelling older adults. Higher frailty index, cognitive impairment, depressive symptoms were associated with elder abuse during homecare assessments. Patients who are victims of elder abuse are attending EDs more frequently for low acuity conditions but ED diagnosis at discharge, except for acute intoxication, are similar.

Keywords: elder abuse, epidemiology, neglect

LO14

Unrecognized delirium in a cohort of older ED patients assessed at a tertiary care center: signs of improvement?

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Introduction: BACKGROUND: Recognition rates of delirium in older ED patients were reported between 13 to 25% in studies conducted in the U.S in the 1990's. Recently, there has been increased attention to delirium in Emergency Medicine, with the development of Geriatric curriculums in Canada specifically focused on delirium. However rates of delirium recognition have not been reassessed in Canadian ED's. OBJECTIVES: To assess the rate of delirium recognition by ED staff in a cohort of older ED patients assessed at a tertiary care Canadian ED. **Methods**: STUDY DESIGN: Prospective observational cohort study at a Canadian teaching ED. PARTICIPANTS: Eligible patients were aged ≥70 years and older who had stayed in the ED for a minimum of 4 hours. We excluded patients who were critically ill, visually impaired or otherwise unable to communicate. DATA COLLECTION: Trained research assistants approached clinical staff prior to approaching patients to confirm that patients were delirium free. They then assessed demographics, ED length of stay (LOS) and cognition using the validated Montreal Cognitive Assessment scale (MOCA), mini-mental status exam (MMSE), delirium index and Richardson Agitation Scale (RASS) at baseline. Delirium was assessed using the validated Confusion Assessment Method (CAM). We report descriptive statistics and 95% confidence intervals (CI) where appropriate. **Results**: We enrolled 203 patients of which 102 (50.3%) were female. Their mean age was 81.0 years, mean LOS was 16.3 hours, mean MOCA was 23.4 and mean MMSE was 26.7. RA's detected delirium using the CAM in 16/203 patients (7.9%, 95% CI 4.6 to 12.5%). Mean MOCA and MMSE for delirious patients was 13.4 and 18.3 and their mean DI was 6.4. All CAM positive patients were deemed to be delirium free by clinical staff. RA alerted clinical staff in all cases where patients had delirium, but 3/16 were discharged home (18.8%, 95% CI 4.1 to 45.7%). **Conclusion**: Our findings confirm previous low delirium recognition rates in a Canadian Tertiary ED. Future research should explore barriers and facilitators to recognizing delirium in the ED.

Keywords: delirium, emergency department, geriatrics

LO15

The incidence of intracranial bleeding following a fall on level ground in geriatric patients

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Introduction: Falls are a common presentation to the emergency department among geriatric patients. The incidence of intracranial bleeding following a fall is unclear and approach to ordering a CT head scan is not standardized. The aim of this systematic review and meta-analysis was to establish the incidence of intracranial bleeding after a fall in geriatric patients. **Methods**: The systematic review was registered in PROSPERO. Two authors independently searched Medline and EMBASE (OVID interface) from conception till 20th June 2018. The search combined multiple MESH terms and text words for [falls], [elderly] and [brain injury]. The search was repeated in Google Scholar and recent conference abstracts were reviewed. Studies were included if > 80% of the included patients were > 65 years who presented to the emergency department after a fall on level ground. We excluded studies enrolling select populations (for example trauma team activation, neurosurgical patients or only anticoagulated patients). There were no language restrictions. The random effects model was used to perform a meta-analysis on the incidence of intracranial bleeding in geriatric patients after a fall on level ground. **Results**: From the 7,043 titles and abstracts, 175 full articles were reviewed and 7 studies, including 6758 patients, were included in the analysis. 2/7 studies were prospective. The studies varied in their inclusion criteria with 3/7 studies only including patients with normal neurological testing. Most retrospective studies included patients if they had a CT head scan. Neither prospective study imaged all patients but both followed the patients for a delayed diagnosis of intracranial bleeding. Risk of bias was moderate or high for the majority of studies. The random effects pooled incidence of intracranial bleeding was 5.2% (95% CI 2.8 – 8.2%), I2 96%. **Conclusion**: Around 1 in 20 geriatric patients who present to the emergency department after a fall have intracranial bleeding. This point estimate can be used to calculate sample size requirements for future studies on intracranial bleeding in this population.

Keywords: falls, geriatrics, intracranial bleeding

LO16

Predictors of appropriate hospitalization in elderly patients

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Introduction: Admission decisions in older patients are often difficult. Our objectives were to identify clinical predictors of appropriate admission for older patients who attend the emergency department (ED). **Methods**: Administrative data were gathered on all Calgary ED patients >75 years old who were treated during 2017. We considered the following events indicative of appropriate admission: an index hospitalization lasting >72 hours, the need for ICU or CCU care, and 30-day death or readmission. Multivariable logistic regression was used to determine the association of the following potential predictors with appropriate admission: age, sex, EMS arrival, ILI symptoms, living situation (independent, homecare dependency or facility), acuity level, chief complaint, vital signs, need for IV fluid bolus (>1Li), serum sodium, potassium, creatinine, hemoglobin, and advanced directive care level (comfort, medical, resuscitation, unspecified). **Results**: We studied 38866 older patients who were 55.9% female with a mean age of 84. Most (69%) lived independently, with 17% in a facility and 14% homecare dependent. Overall, 16,992 (43.7%) were admitted at their index visit and 17,340 had an outcome event, including index hospitalization >72 hours (N = 13,623, 35%), ICU care (352, 0.9%), CCU care (447, 1.2%), or 30-day death (2,241, 5.8%) or readmission (3,964 10.2%). Patients with appropriate admission events were more likely to have an advanced directive (80.7% v. 7.8%), triage hypoxia (30.5% v. 9.2%), EMS arrival (73% v. 48%), facility or homecare dependency (50% v. 15%), or to have a complaint of dyspnea (20.4% v. 8.6%), weakness (9.1% v. 3.8%) or altered mentation (8.8% v. 2.8%). Multivariable modeling showed that the strongest predictors of appropriate admission (adjusted odds ratio) were any advanced directive (OR = 30), need for IV bolus (OR = 1.67), homecare dependency (OR = 1.65), triage hypoxia (OR = 1.63), and a chief complaint of altered mentation (OR = 1.72), weakness (OR = 1.52) or dyspnea (OR = 1.25). **Conclusion**: The presence of an advanced care directive is strongly associated with appropriate admission in older ED patients. Other significant

determinants include homecare dependency, EMS arrival, hypoxia or dyspnea, IV bolus and weakness or altered mentation. Age, sex, acuity, vital signs and laboratory findings were weak predictors.
Keywords: emergency, geriatric, outcomes

LO17

Barriers and enablers that influence guideline-based care of geriatric falls patients presenting to the emergency department

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Introduction: Geriatric patients commonly present to the emergency department (ED) after a fall. Unfortunately, recent evidence suggests that ED physicians are poorly adherent to published ED-specific geriatric falls guidelines. This study applied a theoretical domains framework (TDF)-driven approach to systematically investigate barriers and enablers in the provision of guideline-based care to older patients presenting to the ED with a fall. **Methods**: From June to September 2017, semi-structured interviews of staff ED physicians practicing in Ontario, Canada were conducted and analyzed. An interview guide based on the TDF was used to capture 14 domains that may influence provision of guideline-based care. Interview transcripts were analyzed, and specific beliefs were generated by grouping similar responses. Relevant domains were identified based on frequencies of beliefs, existence of conflicting beliefs, and evidence of strong beliefs that would influence provision of guideline-based care. **Results**: Eleven interviews were conducted with practicing ED physicians. Thirty specific belief statements across 13 different TDF domains (all except Optimism) were identified as relevant. Overall, Ontario ED physicians are supportive of providing guideline-based care and believe it would lead to better outcomes for geriatric falls patients. Important barriers include knowledge, skills, time and workload constraints, and inconsistent allied health support. **Conclusion**: This study identified important barriers and enablers to provision of guideline-based care in geriatric ED falls patients. These results will help guide implementation of guidelines nationally and internationally, with a focus on improved knowledge dissemination, implementation of training interventions, and improvements in allied health coverage and supports.
Keywords: falls, geriatrics, guidelines

LO18

The effectiveness of parenteral agents to reduce relapse in patients with acute migraine in emergency settings: a systematic review

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Introduction: Although a variety of parenteral agents exist for the treatment of acute migraine, relapse after an emergency department (ED) visit is still a common occurrence. The objective of this systematic review was to update a previous review examining the effectiveness of parenteral agents for the treatment of acute migraine in the ED or equivalent acute care setting; our review focused on those studies aiming a reduction in relapse after an ED visit. **Methods**: A comprehensive search of 10 electronic databases and grey literature was conducted to identify comparative studies to supplement the previous systematic review. Two independent reviewers completed study selection, quality assessment, and data extraction. Any discrepancies were resolved by third party adjudication. Relative risks (RR) with 95% confidence intervals (CIs) were calculated using a random effects model and heterogeneity (I2) was reported. **Results**: Titles and abstracts of 5039 unique studies were reviewed, of which, 51 studies were included. Sixty-four studies from the original review were included, resulting in a total of 115 included studies. Relapse was reported in 44 (38%) included studies and occurred commonly in patients receiving placebo or no interventions (median = 39%; IQR: 14%, 47%). Overall, no differences in headache relapse were found between patients receiving sumatriptan or placebo (RR = 1.09; 95% CI: 0.55, 2.17; I2 = 93%; n = 8). Conversely, patients receiving neuroleptic agents experienced fewer relapses compared to placebo (RR = 0.27; 95% CI: 0.12, 0.58; I2 = 0%; n = 3); however, patients receiving neuroleptics reported an increase in adverse events (RR = 1.87; 95% CI: 1.17, 3.00; I2 = 0%; n = 3). Compared to placebo, patients receiving dexamethasone were less likely to experience a headache recurrence (RR = 0.71; 95% CI: 0.53, 0.95; I2 = 60%, n = 9); however, no differences were found in reported adverse events (RR = 1.09; 95% CI: 0.81, 1.47; I2 = 0%; n = 3). **Conclusion**: Relapse is a common occurrence for patients with migraine headaches. This review found patients receiving neuroleptics or dexamethasone experienced fewer headache recurrences. Conversely, triptan agents appear to have minimal effect on reducing the risk for headache recurrence following discharge from an acute care setting. Limited available data on adverse events is an important limitation to inform decision-making. Guidelines should be revised to reflect these results.
Keywords: migraine, parenteral agents, relapse

LO19

Should emergency physicians bother offering triptans to patients with acute migraine? A systematic review of parenteral agents

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Introduction: Acute migraine headaches are common causes of presentation to the emergency department (ED). There is great variability in the efficacy of the available parenteral agents to manage pain, though triptans are among the recommended treatments. The objective of this systematic review was to update a previous review examining the effectiveness of parenteral agents for the treatment of acute migraine in the ED or equivalent acute care setting; our review examined pain management in emergency settings and assessed the effectiveness of triptan agents. **Methods**: A comprehensive search of 10 electronic databases and grey literature was conducted to supplement the previous systematic review. Two independent reviewers completed study selection, quality assessment, and data extraction. Any discrepancies were resolved by third party adjudication. Pain scale scores were analyzed using standardized mean difference (SMD) with 95% confidence intervals (CIs) calculated using a random effects model; heterogeneity (I2) was reported. **Results**: Titles and abstracts of 5039 unique studies were reviewed, of which, 51 studies were included. Sixty-four studies from the original review were included, resulting in a total of 115 included studies. Pain was measured within the ED or equivalent acute care setting using a variety of pain scales, most commonly the 0-10 cm or 100 mm visual analog scale. Four studies compared pain scores between patients receiving sumatriptan vs. other agents, of which, patients receiving sumatriptan reported higher pain scale scores (SMD = 0.53; 95% CI: 0.04, 1.02; I2 = 80%). In particular, patients receiving sumatriptan reported higher

pain scale scores than patients receiving metoclopramide (SMD = 0.68; 95% CI: 0.31, 1.04; n = 1) or ketorolac (SMD = 1.39; 95% CI: 0.56, 2.21; n = 1). Overall, studies comparing anti-inflammatory agents (i.e., ketorolac or dexketoprofen) to other agents reported improved pain scale scores among patients receiving anti-inflammatory agents (SMD = -0.38; 95% CI: -0.73, -0.03; I2 = 66%; n = 5). **Conclusion**: Limited evidence suggests that patients treated with metoclopramide or anti-inflammatory agents experience greater pain reduction compared to patients treated with sumatriptan. This review will conduct a network analysis of parenteral agents to examine the comparative effectiveness of parenteral agents to manage pain among patients with acute migraine. Further analysis will also consider the balance between efficacy and adverse events.

Keywords: migraine, pain, parenteral agents

LO20

Naloxone dosing for suspected opioid and ultra-potent opioid overdoses: A systematic review

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Introduction: Optimizing naloxone dosing in the context of increasing fentanyl and ultra-potent opioid (UPO) prevalence is an important consideration for emergency health care providers. The goal of this systematic review was to evaluate the association between initial and cumulative naloxone doses on effective reversal and adverse events in undifferentiated and fentanyl/UPO overdoses. **Methods**: We searched Embase, MEDLINE, Cochrane Central Register of Controlled Trials, DARE, CINAHL, Science Citation Index, reference lists, toxicology websites, and conference proceedings from July to October 2018 and back to 1972. Our search included pertinent indexing terms for UPOs. We included interventional and observational studies reporting on naloxone administration for opioid toxicity reversal in people ≥12 years old. Additionally, we accessed non-traditional evidence sources (case reports and series) given this rapidly changing field. We conducted inclusion screens, data extraction and quality assessments in duplicate. We summarized study characteristics and where reported, analyzed number of patients with clinical response. Response was defined as not receiving further naloxone doses and remaining alive. **Results**: We included 174 studies (108 case reports and series, 55 observational, 9 interventional) with 26,660 subjects (median age 35.1; 74.2% male). We observed lower response among patients exposed to fentanyl/UPO versus heroin for initial naloxone doses ≤0.4mg (56.8% versus 80.2%) and > 0.4mg (27.0% versus 82.1%). Mean cumulative doses were higher for fentanyl/UPO (2.10 mg, SD 1.80 mg) versus heroin (1.48 mg, SD 1.68 mg) overdoses. In North American studies the median cumulative dose used was higher for fentanyl/UPO versus heroin overdoses. A dose-response curve for fentanyl/UPO studies showed marked variability in doses among responders, indicating heterogeneity. Adverse events reporting was inconsistent; 10% of subjects experienced withdrawal based on studies in which they were reported. **Conclusion**: This is the first systematic review to summarize proportion of patients with clinical response by naloxone dose provided. While variable reporting, study quality, heterogeneity, and our outcome definitions limit the conclusions we can draw, it appears that higher initial doses and in some cases, higher cumulative naloxone doses were used and may be necessary to reverse toxicity due to fentanyl/UPO compared to other opioids. High-quality prospective studies assessing effectiveness and safety are needed.

Keywords: fentanyl, naloxone, opioid-related disorders

LO21

One-year mortality of patients treated in the emergency department for an opioid overdose: a single-centre retrospective cohort study

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Introduction: Opioid overdoses (OODs) have become a public health emergency, yet little is known about their long-term outcomes following an OD. We determined the one-year all-cause mortality and associated risk factors in a cohort of patients treated in an urban emergency department (ED) for an OOD. **Methods**: We reviewed records of all patients who visited St. Paul's Hospital ED from January 2013 to August 2017 and had a discharge diagnosis of OOD or had received naloxone in the ED as per pharmacy records. Patients with a suspected OOD were identified on structured chart review. A patient's first visit for an OOD during the study period was used as the index visit, with subsequent visits excluded. The primary outcome was mortality during the year after the index visit. Mortality was assessed by linking patient electronic medical records with Vital Statistics data. Deaths that occurred in the ED on the index visit were excluded. Patients admitted to hospital following ED treatment were included in this study. We described patient characteristics, calculated mortality rates, and used Cox regression to identify risk factors. **Results**: A total of 2239 patients visited the ED for an OOD during the study period, with a median patient age of 37 years (IQR 29, 49). Males comprised 73% of patients, while 28% had no fixed address, and 21% received take-home naloxone at the index visit. In total, 137 patients (6.1%) died within 1 year of the index visit. Eighty-one deaths (3.6%) occurred within 6 months, including 24 deaths (1.1%) that occurred within 1 month. The highest mortality rate occurred in 2017, with 8.0% of patients entering the cohort that year dying within 1 year. Gender did not significantly impact mortality risk. A Cox regression analysis controlled for gender, housing status, and whether take-home naloxone was provided at the index visit indicated that advancing age (adjusted hazards ratio [AHR] 1.03; 95%CI: 1.01-1.04 for each year increase in age) and the index visit calendar year (AHR 1.30; 95%CI: 1.10-1.54 for each yearly increase in the study period) were significant factors for mortality within 1 year. **Conclusion**: The mortality rate following an opioid OD treated in the ED is high, with over 6% of patients in our study dying within 1 year. The rising mortality risk with increasing calendar year may reflect the growing harms of fentanyl-related OODs. Patients visiting the ED for an OOD should be considered high risk and offered preventative treatment and referrals prior to discharge.

Keywords: mortality, opioid, overdose

LO22

Does point-of-care ultrasonography improve diagnostic accuracy in emergency department patients with undifferentiated hypotension? An international randomized controlled trial from the SHoC-ED investigators

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Introduction: Point of care ultrasound has been reported to improve diagnosis in non-traumatic hypotensive ED patients. We compared diagnostic performance of physicians with and without PoCUS in undifferentiated hypotensive patients as part of an international prospective randomized controlled study. The primary outcome was diagnostic performance of PoCUS for cardiogenic vs. non-cardiogenic shock. **Methods**: SHoC-ED recruited hypotensive patients (SBP < 100 mmHg or shock index > 1) in 6 centres in Canada and South Africa. We describe previously unreported secondary outcomes relating to diagnostic accuracy. Patients were randomized to standard clinical assessment (No PoCUS) or PoCUS groups. PoCUS-trained physicians performed scans after initial assessment. Demographics, clinical details and findings were collected prospectively. Initial and secondary diagnoses including shock category were recorded at 0 and 60 minutes. Final diagnosis was determined by independent blinded chart review. Standard statistical tests were employed. Sample size was powered at 0.80 (α:0.05) for a moderate difference. **Results**: 273 patients were enrolled with follow-up for primary outcome completed for 270. Baseline demographics and perceived category of shock were similar between groups. 11% of patients were determined to have cardiogenic shock. PoCUS had a sensitivity of 80.0% (95% CI 54.8 to 93.0%), specificity 95.5% (90.0 to 98.1%), LR+ve 17.9 (7.34 to 43.8), LR-ve 0.21 (0.08 to 0.58), Diagnostic OR 85.6 (18.2 to 403.6) and accuracy 93.7% (88.0 to 97.2%) for cardiogenic shock. Standard assessment without PoCUS had a sensitivity of 91.7% (64.6 to 98.5%), specificity 93.8% (87.8 to 97.0%), LR+ve 14.8 (7.1 to 30.9), LR- of 0.09 (0.01 to 0.58), Diagnostic OR 166.6 (18.7 to 1481) and accuracy of 93.6% (87.8 to 97.2%). There was no significant difference in sensitivity (-11.7% (-37.8 to 18.3%)) or specificity (1.73% (-4.67 to 8.29%)). Diagnostic performance was also similar between other shock subcategories. **Conclusion**: As reported in other studies, PoCUS based assessment performed well diagnostically in undifferentiated hypotensive patients, especially as a rule-in test. However performance was similar to standard (non-PoCUS) assessment, which was excellent in this study.

Keywords: diagnosis, hypotension, point of care ultrasonography (PoCUS)

LO23

Identifying patient values and expectations for pulmonary embolism CT scanning in the emergency department

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Introduction: There is an evidence-practice gap between guidelines for diagnosing pulmonary embolism (PE) and emergency physician practice. Computed tomography (CT) scanning is being overused to exclude PE in Canadian emergency departments (EDs) and current guidelines do not fit well with the ED model of patient care. There is a lack of research on patient opinions on PE testing, and a poor physician understanding of patient-specific goals in the ED. We are addressing this by conducting patient interviews to identify patient-specific values and opinions on PE testing in the ED. These will be used to develop patient-centered educational tools which physicians and patients can use to discuss the decision to order a CT PE scan. The aim of this study is to identify patient expectations and priorities on PE testing in the ED. **Methods**: This qualitative study uses constructivist grounded theory to analyze patient values and opinions on PE testing in ED patients from two hospitals. Participants are screened by monitoring the ED patient tracker. If a patient is being tested for PE, they are approached and consented by a researcher to take part in a 30-minute semi-structured interview. Each interview is transcribed verbatim and independently analyzed by four researchers using constant comparative coding. The researchers meet weekly to compare codes and agree on common coding terms. The codes are grouped into themes, and the interview script is modified to maximize information on emerging themes. From this, major themes with associated subthemes will be derived, each representing an opportunity, barrier or value which must be addressed in our new patient education tools. We have performed 23 interviews and expect to reach theme saturation at 30 interviews. Full results will be available by the 2019 CAEP conference. **Results**: From the patient interviews conducted so far, we have mapped four major themes: patient satisfaction comes from addressing their primary concern (for example, their pain); patients expect individualized care; patients prefer imaging over clinical examination when testing for PE; and patients expect 100% confidence from their ED physician when given a diagnosis. **Conclusion**: These four domains will be used to create a new patient-centered approach to PE testing in the ED which will include physician education, patient information and organizational changes to patient processing. This study incorporates evidence-based medicine with ethical and social implications to improve patient outcomes.

Keywords: decision making, patient-centred care, pulmonary embolism

LO24

What patients need early surgical intervention for acute ureteric colic?

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Introduction: Ureteral colic is a common painful disorder. Early surgical intervention is an attractive management option but existing evidence does not clarify which patients benefit. Based on lack of evidence, current national specialty guidelines provide conflicting recommendations regarding who is a candidate for early intervention. We compared treatment failure rates in patients receiving early intervention to those in patients offered spontaneous passage to identify subgroups that benefit from early intervention. **Methods**: We used administrative data and structured chart review to study consecutive patients attending one of nine hospitals in two provinces with an index emergency department (ED) visit and a confirmed 2.0-9.9 mm ureteral stone. We described patient, stone and treatment variables, and used multivariable regression to identify factors associated with treatment failure, defined as the need for rescue intervention or hospitalization within 60 days. Our secondary

outcome was ED revisit rate. **Results**: Overall, 1168 (37.9%) of 3081 eligible patients underwent early intervention. Patients with small stones <5mm experienced more treatment failures (31.5% v. 9.9%) and more ED revisits (38.5% v. 19.7%) with early intervention than with spontaneous passage. Patients with large stones ≥7.0mm experienced fewer treatment failures (34.7% v. 58.6%) and similar ED revisit rates with early intervention. Patients with intermediate-sized 5.0-6.9mm stones had fewer treatment failures with intervention (37.4% v. 55.5%), but only if stones were in the proximal or middle ureter. **Conclusion**: This study clarifies stone characteristics that identify patients likely to benefit from early intervention. We recommend low-risk patients with uncomplicated stones <5mm generally undergo initial trial of spontaneous passage, while high-risk patients with proximal or middle stones >5mm, or any stone >7mm, be offered early intervention.

Keywords: intervention, outcomes, renal colic

LO25

Use of Glasgow Blatchford Score, time to endoscopy, and proton pump inhibitor use in patients presenting with upper gastrointestinal bleeding to the emergency department

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Introduction: Upper gastrointestinal bleeding (UGIB) is a common presentation to the emergency department (ED). Early endoscopy within 24 hours has been shown to reduce re-bleeding rates and lower mortality. However, low-risk patients can often be managed through outpatient follow-up. The aim of this study was to compare the timing and appropriateness of endoscopy and proton pump inhibitor (PPI) use in a tertiary care ED setting for low- and high-risk patients determined using the Glasgow Blatchford Score (GBS). **Methods**: Retrospective chart review was conducted to examine the management of patients presenting with an UGIB in 2016 to the University of Alberta Hospital ED. TANDEM and Emergency Department Information System (EDIS) databases were used to identify patients using specific ICD-10 codes and the CEDIS presenting complaints of vomiting blood or blood in stool/melena. Patients with GBS 0-3 were categorized as low-risk and those with GBS > 3 were considered high-risk with appropriateness of and time to endoscopy, disposition of patient at 24 hours, and use of PPIs determined for each group. **Results**: A total of 400 patients were included. A total of 319/400 patients (80%) underwent esophagogastroduodenoscopy (EGD). EGD was performed within 24 hours in 37% of patients (29/78) with GBS 0 to 3 and in 77% (248/322) with GBS greater than 3. Of the remaining high-risk patients, 11% (36/322) underwent EGD after 24 hours and 12% (38/322) did not undergo EGD. The endoscopic diagnoses were peptic ulcer disease (PUD) in 41% of patients (130/319), esophagitis in 18% (56/319), and varices in 14% (45/319). PPIs (data available 375/400) were administered (mainly intravenously) to 93% (279/300) of high-risk and 79% (59/75) of low-risk patients. Data on patient disposition showed 60/322 (19%) high-risk patients were discharged from the ED within 24 hours and only 31/60 (52%) of these underwent EGD before discharge. Of 29 low-risk patients undergoing EGD within 24 hours, 9 (31%) were admitted, 17 (59%) were discharged from ED, and 3 (10%) were kept for observation in the ED greater than 24 hours. Of low-risk patients, 76% (59/78) were discharged from the ED within 24 hours. **Conclusion**: A majority of patients presenting with UGIB appropriately received endoscopy within 24 hours. 19% of high-risk patients were discharged from the ED. Earlier discharge for low-risk patients can be improved as only 76% of low-risk patients were discharged from the ED within 24 hours. As expected, PPI use was high in these patients.

Keywords: endoscopy, gastrointestinal bleeding, management

LO26

Are ED physicians contributing to the opioid epidemic?

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Introduction: There is an opioid epidemic which has seen an increased mortality rate of 200% related to opioid use over the past decade. Prescription practices amongst ED physicians may be contributing to this problem. Our objective was to analyze ED physician prescription practices for patients discharged from the ED with acute fractures. **Methods**: We conducted a health records review of ED patients seen at two campuses of a tertiary care hospital with total annual census of 160,000 visits. We evaluated a consecutive sample of patients with acute fractures (January 1 2016–April 15 2016) seen and discharged by ED physicians. Patients admitted to hospital or discharged by consultant services were excluded. The primary outcome measure was the proportion of patients discharged with an opioid prescription. We collected data using a screening list, review of electronic records, and interobserver agreement for measures. We calculated simple descriptive statistics and estimated 4 months would be required to enroll 250 patients receiving opioid prescriptions. **Results**: We enrolled 816 patients, with 442 females (54.2%), median CTAS score of 3, and median pain score at triage of 6/10. The most common fractures were wrist/hand (35.2%) and foot excluding ankle (14.8%). An ED pain directive was used at triage for 21.2% and 281 patients (34.4%) received an opioid during ED stay, with tramadol (21.2%) being the most common. Overall, 250 patients (30.6%) were discharged with the following opioid prescriptions and median total dosages: hydromorphone (N = 114, median dosage 23mg, range 1–120mg), tramadol (N = 86, 1000mg, 200–2000mg), oxycodone (N = 33, 100mg, 10–170mg), codeine (N = 20, 600mg, 360–1200mg), and morphine (N = 9, 100mg, 25–200mg). Of patients prescribed hydromorphone, 61 (53.5%) were prescribed > 20mg. Overall, 35 patients (4.3%) had a pain related ED visit <1 month after discharge, of which 14 (40%) received an opioid prescription on initial discharge, and 12 (34.2%) received an opioid prescription upon subsequent discharge. **Conclusion**: Amongst patients presenting to the ED with acute fractures, the majority were not discharged home with an opioid prescription from ED physicians. Hydromorphone was the most common opioid prescribed, with large variations in total dosage. Despite only a minority of patients receiving opioid prescriptions, there were very few return to ED visits. To limit potential abuse, we recommend standardization of opioid prescribing in the ED, with attention to limiting the total dosage given.

Keywords: analgesia, fractures, opioids

LO27

Risk factors for misuse of prescribed opioids: a systematic review and meta-analysis

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Introduction: Increasing opioid prescribing has been linked to an epidemic of opioid misuse. Our objective was to synthesize available evidence about patient-, prescriber-, medication-, and system-level risk factors for developing opioid misuse from prescribed opioids among patients presenting with pain unrelated to cancer. Our hypothesis was that we would identify risk factors predisposing patients to developing opioid misuse. **Methods**: We developed a systematic search strategy and applied it to nine electronic reference databases and six clinical trial registries. We hand searched related journals and conference proceedings, the reference lists of included studies, and the top 100 hits on Google. We included studies where a medical professional exposed adults or children to an opioid through a prescription. We excluded studies with over 50% cancer patients, palliative patients, and those with illicit opioid initiation. Two reviewers independently reviewed titles, abstracts, and full texts, and extracted data using standardized forms. We assessed study quality using risk of bias. We synthesized effect sizes of dichotomous risk factors on opioid misuse using inverse variance random-effects meta-analysis, and the inverse variance-weighted mean difference between opioid misusers and non-misusers for continuously measured factors. We conducted an a priori defined subgroup analysis among opioid-naïve patients. **Results**: Among 9,629 studies, 67 met our inclusion criteria. Among those who had been prescribed outpatient opioids, the following factors were associated with the development of misuse: a prior history of illicit drug use (OR: 4.21, 95% CI: 2.31-7.65), recent benzodiazepine use (OR: 2.57, 95% CI: 1.23-5.38), any mental health diagnosis (OR: 2.45, 95% CI: 1.91-3.15), any short acting (IR) opioid prescription (OR: 2.40, 95% CI: 1.15-5.02), younger age (OR: 2.19, 95%CI: 1.81-2.64), and male sex (OR: 1.23, 95% CI: 1.10-1.36). Among studies limiting their population to opioid-naïve patients, younger age was the most significant risk factor for opioid misuse (OR: 5.42, 95% CI:1.51-19.43). **Conclusion**: Of the risk factors examined, non-cancer pain patients with a prior history of substance use or mental health diagnoses were at highest risk for prescription opioid misuse. Younger opioid-naïve patients were at highest risk of misuse. Clinicians should consider these risk factors when managing acute pain in the emergency department.

Keywords: medication safety, opioid misuse, opioid prescribing

LO28

Emergency department gastrointestinal presentations related to marijuana ingestion: a single centre retrospective study

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Introduction: Cannabis Hyperemesis Syndrome (CHS) is a poorly understood phenomenon with a subset of patients presenting to the emergency department (ED) for symptomatic control of refractory nausea and vomiting. As legalization of marijuana commenced on October 2018, it is important to recognize the presentation of patients related to marijuana consumption. The objective of this study was to describe demographic and ED visit data of patients presenting to the ED with cannabis-related sequelae. **Methods**: This was a health records review of patients ≥18 years presenting to one of two tertiary care EDs (annual census 150,000 visits) with a discharge diagnosis including cannabis use with one of abdominal pain or nausea/vomiting using ICD-10 codes. Trained research personnel collected data from medical records including demographics, clinical history, results of investigations within the ED. Descriptive statistics including means and standard deviations are presented where appropriate. **Results**: From April 2014 to June 2016, 203 unique ED patients had a discharge diagnosis including cannabis use with abdominal pain or nausea/vomiting. Mean (SD) age was 30 (13.04) years and 120 (59.1%) were male. Patients presented to the ED independently 84 (41.4%), via EMS with 104 (51.23%) and 15 (7.39%) by police. The majority of patients were triaged as CTAS-2 in 27 (33%) and CTAS-3 in 106 (52.2%) of all cases. Of patients disclosing their method of consumption, 31 (15.3%) had used combustion methods and 30 (14.8%) had edible marijuana. Mean (SD) serum potassium was 3.71 (0.48) mmol/l. 162 (79.8%) were discharged home and 9 (4.4%) were given follow up (all psychiatric). Twenty-nine (14.3%) were admitted to hospital with 28 (13.8%) admitted to psychiatry and 1 (0.5%) admitted to medicine. **Conclusion**: This ED-based retrospective chart review reports a description of cannabis-related presentations to the ED. Clinicians should be aware of CHS in patients presenting to the ED, especially as Canada enters the era of legalization. Future research should focus on the impact of federal legalization of marijuana on ED utilization for CHS-related presentations.

Keywords: cannabis, emergency, marijuana

LO29

Unexplained variation in 'to-go' opioid prescribing across emergency departments in a large Canadian cohort

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Introduction: Emergency Department (ED) opioid prescribing has been linked to long-term use and dependence. Small packets of opioid medications are sometimes prescribed at discharge, i.e. 'To-Go', in an attempt to treat pain but avoid unintended consequences. The extent of this practice and its associated risks are not fully understood. This study's objective was to describe the use of 'To-Go' opioids in a large urban center. **Methods**: Multicenter linked administrative databases were used to recruit an observational cohort. The referral population was comprised of all patients discharged from a Calgary ED in 2016 (four hospitals) with an arrival pain score greater than 0. We first described this population and then performed a multivariable analysis to assess for predictors of 'To-Go' opioids. 'To-Go' opioids were either Tylenol-Codeine or Tylenol-Oxycodone. **Results**: A total of 88,855 patients were recruited. The majority were female (57%) and the average age was 44.5 yrs. Abdominal pain was the most frequent complaint (22.1%) followed by extremity (18.3%) and cardiac pain (8.0%). Overall, 2,736 patients (3.1%) received an opioid 'To-Go' with significant variation in prescribing rates across hospitals (1.8-5% Chi2 $p < 0.05$). Logistic regression (covariates: age, sex, CTAS, pain score, type of pain, hospital, ED opioid, length of stay) revealed that receiving an opioid (IV or PO) prior to discharge was the strongest predictor of 'To-Go' opioid (OR 6.4 [5.9-7.0]). Hospital (OR 1.4 [1.3-1.4]) and male sex (OR 1.2 [1.1-1.3]) also emerged as predictors, whereas age over 65 decreased the odds of 'To-Go' opioid (OR 0.8 [0.6-0.9]). Hospital-specific ORs ranged from 1.3-2.7. **Conclusion**: In comparable patient populations some hospitals are more likely than others to provide a short course of opioids at discharge. This difference is not explained by patient demographics, pain profiles, or medications prior to discharge. The reasons for this variation are unclear but it underscores the need to determine the risks of ED opioid exposures and develop clear evidence-based prescribing guidelines.

Keywords: opioids, pain, 'to-go'

LO30

Assessing screening tools to identify patients with palliative care needs in the emergency department: a systematic review

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Introduction: With an increasing proportion of patients in need of end-of-life (EOL) care presenting to the emergency department (ED), many of these patients may benefit from early palliative care (PC) referral. In fact, early PC referral is one of the Choosing Wisely ED recommendations in the USA. As such, there is a potential benefit to identifying patients with advanced or end-stage illness with PC needs. The objective of this systematic review is to identify and synthesize the available evidence regarding the existence and psychometric properties of screening tools to identify patients with advanced or end-stage illness and PC needs presenting to EDs. **Methods**: A comprehensive search of eight electronic databases and the grey literature was conducted. Studies assessing the ability of a screening instrument to identify ED patients with advanced or end-stage illness in need of PC were eligible for inclusion. Two independent reviewers completed study selection, quality assessment, and data extraction. Disagreements were resolved through third-party adjudication. Due to the significant heterogeneity, as well as inconsistent outcome reporting, a descriptive summary of the results was completed. **Results**: Once duplicates were removed, the title and abstracts of 3516 studies were screened, of which, 15 studies were included. Overall, 10 unique screening instruments were assessed across the studies. The most commonly assessed screening tool was the use of the modified surprise question (SQ), in which physicians were asked if they would be surprised if the patient died within a specified period of time. Only four of the included studies assessed the diagnostic or psychometric properties of the screening tools. One study reported that the modified SQ predicted PC consultation with 35% sensitivity, 89% specificity, and a negative predictive value of 97%. The proportion of patients identified with PC needs ranged from 12% to 73%, with studies utilizing the SQ reporting a range of 12% to 33%. **Conclusion**: A variety of screening tools are available to identify ED patients with advanced or end-stage illness who would benefit from a referral for PC. While the modified SQ was the most common instrument assessed and appears to be simple to implement, it is unclear if the diagnostic and psychometric properties of this tool are sufficiently robust to warrant widespread implementation.

Keywords: emergency department, palliative care, screening tools

LO31

Patients' and caregivers' experiences with pain management in children and teenagers with sickle cell disease requiring admission for vaso-occlusive crisis

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Introduction: The quality of life of children with sickle cell disease (SCD) depends on the severity, timing and number of painful episodes (vaso-occlusive crises, VOC) and their need for medical treatment and hospitalizations. The objective of this study was to explore the experiences of pediatric patients and their families during VOC. **Methods**: This qualitative study used semi-structured one-on-one and focus group interviews, designed in partnership with two patients and one parent, in a single center, tertiary care pediatric university-affiliated hospital. Two groups of participants were interviewed independently: (1) adolescent patients aged 12 to 18 years old hospitalised within the last 2 years for VOC, (2) parents of pediatric patients with SCD hospitalised within the last 2 years for VOC. Data was transcribed in full and analysed using NVivo12. Descriptive thematic content analysis was performed by coding themes emerging from data. After validating codes through interjudge assessment by consensus, themes from teenagers' and parent's discourses were systematically compared for the final analysis. **Results**: Between June and August 2018, 8 interviews were conducted. 10 parents and 5 adolescents participated. Teenagers' and parents' answers mirrored each other's. Prompt pain relief was crucial, although the side effects of pain relief medications used were an added source of suffering. Recent quality improvement initiatives such as standardised order sheets were noteworthy improvements, though personalizing care to each patient's with pharmacological and non-pharmacological methods was also important to participants. Given the unpredictability and severity of VOC, their impact on both patients' and families' lives were substantial, as was the long term emotional burden. Parents felt guilty given the hereditary nature of the disease, they encouraged neonatal and prenatal testing, and they sought definitive treatments for both VOC and SCD. Tensions within parent-teenager relationships were described centered on developing autonomy and protecting the child to improve adherence to treatments. **Conclusion**: Participants emphasized the need to provide timely adequate analgesia, through both standardised quality improvement initiatives and a personalised approach to analgesia. Understanding the impact of VOC on patients' lives and their socio-familial context is important to tailor clinical interventions.

Keywords: pain experience, pediatric patients, vaso-occlusive crisis

LO32

A two-centre survey of caregiver perspectives on opioid use for children's acute pain management

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Introduction: Given the current opioid crisis, caregivers have mounting fears regarding use of opioid medication in their children. Since caregivers are often the gatekeepers to their children's pain management, understanding their perspectives on analgesics is essential. For caregivers of children with acute injury presenting to the pediatric emergency department (PED), we aimed to determine caregivers': a) willingness to accept opioids from emergency care providers, b) reasons for refusing opioids, and c) past experiences with opioids. **Methods**: A novel 31-item electronic survey was offered, via tablet device, to caregivers of children aged 4-16 years who had a musculoskeletal injury <7 days old and presented to one of two Canadian PEDs between March and November 2017. Primary outcome was caregiver willingness to accept opioids for moderate pain for their children. **Results**: 517 caregivers completed the survey; mean age was 40.9 +/−7 years with 70.0% (362/517) being mothers. Children included 62.2% (321/516) males with an overall mean age of 10 +/−3.6 years. 49.6% of caregivers (254/512) reported willingness to accept opioids for moderate pain that persisted after non-opioid analgesia, while 37.1% (190/512) were unsure what they would do. Only 33.2% (170/512) of caregivers stated they would accept opioid analgesia upon discharge while 45.5% (233/512) were unsure about at-home use. Caregivers were primarily concerned about side effects, overdose, addiction, and masking of diagnosis. Caregiver fear of

addiction (OR 1.12, 95% CI 1.01-1.25) and side effects (OR 1.25, 95% CI 1.11-1.42) increased the odds of rejecting opioids in the emergency department, while fears of addiction (OR 1.19, 95% CI 1.07-1.32) and overdose (OR 1.15, 95% CI 1.04-1.27) increased the odds of rejecting opioids for at-home use. **Conclusion**: Only half of caregivers reported that they would accept opioids for moderate pain, despite ongoing pain following non-opioid analgesics. Caregiver fears of addiction, side effects, overdose, and masking their child's diagnosis influence their behaviours. These findings are a first step in understanding caregiver decision-making and can guide healthcare providers in their conversations about acute pain treatment with families.
Keywords: opioid, pain, pediatric

LO33

External cold and vibration for pain management of children undergoing needle-related procedures in the emergency department: a randomized controlled non-inferiority trial

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Introduction: Needle-related procedures are considered the most important source of pain and distress in children in hospital settings. Time constraints, heavy workload, busy and noisy environment represent barriers to the use of available interventions for pain management during needle-related procedures. Therefore, the use of a rapid, easy-to-use intervention could improve procedural pain management practices. The objective was to determine if a device combining cold and vibration (Buzzy) is non-inferior (no worse) to a topical anesthetic (Maxilene) for pain management in children undergoing needle-related procedures in the Emergency Department (ED). **Methods**: This study was a randomized, controlled, non-inferiority trial. We enrolled children aged between 4-17 years presenting to the ED and requiring a needle-related procedure. Participants were randomly assigned to the Buzzy or Maxilene group. The primary outcome was the mean difference in pain intensity during the procedure, as measured with the CAS (0-10). Secondary outcomes were procedural distress, success of the procedure at first-attempt and satisfaction of parents. **Results**: A total of 352 participants were enrolled and 346 were randomized (Buzzy = 172; Maxilene = 174). Mean difference in procedural pain scores between groups was 0.64 (95%CI -0.1 to 1.3), showing that the Buzzy device was not non-inferior to Maxilene according to a non-inferiority margin of 0.70. No significant differences were observed for procedural distress (p = .370) and success of the procedure at first attempt (p = .602). Parents of both groups were very satisfied with both interventions (Buzzy = 7.8 ±2.66; Maxilene = 8.1 ±2.4), but there was no significant difference between groups (p = .236). **Conclusion**: Non-inferiority of the Buzzy device over a topical anesthetic was not demonstrated for pain management of children during a needle-related procedure in the ED. However, considering that topical anesthetics are underused in the ED setting and require time, the Buzzy device seems to be a promising alternative as it is a rapid, low-cost, easy-to-use and reusable intervention.
Keywords: emergency department, pain management, pediatrics

LO34

Predictors of intravenous rehydration in children with acute gastroenteritis in the United States and Canada

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Introduction: Although oral rehydration therapy is recommended for children with acute gastroenteritis (AGE) with none to some dehydration, intravenous (IV) rehydration is still commonly administered to these children in high-income countries. IV rehydration is associated with pain, anxiety, and emergency department (ED) revisits in children with AGE. A better understanding of the factors associated with IV rehydration is needed to inform knowledge translation strategies. **Methods**: This was a planned secondary analysis of the Pediatric Emergency Research Canada (PERC) and Pediatric Emergency Care Applied Research Network (PECARN) randomized, controlled trials of oral probiotics in children with AGE-associated diarrhea. Eligible children were aged 3-48 months and reported > 3 watery stools in a 24-hour period. The primary outcome was administration of IV rehydration at the index ED visit. We used mixed-effects logistic regression model to explore univariable and multivariable relationships between IV rehydration and a priori risk factors. **Results**: From the parent study sample of 1848 participants, 1846 had data available for analysis: mean (SD) age of 19.1 ± 11.4 months, 45.4% females. 70.2% (1292/1840) vomited within 24 hours of the index ED visit and 34.1% (629/1846) received ondansetron in the ED. 13.0% (240/1846) were administered IV rehydration at the index ED visit, and 3.6% (67/1842) were hospitalized. Multivariable predictors of IV rehydration were Clinical Dehydration Scale (CDS) score [compared to none: mild to moderate (OR: 8.1, CI: 5.5-11.8); severe (OR: 45.9, 95% CI: 20.1-104.7), P < 0.001], ondansetron in the ED (OR: 1.8, CI: 1.2-2.6, P = 0.003), previous healthcare visit for the same illness [compared to no prior visit: prior visit with no IV (OR: 1.9, 95% CI: 1.3-2.9); prior visit with IV (OR: 10.5, 95% CI: 3.2-34.8), P < 0.001], and country [compared to Canada: US (OR: 4.1, CI: 2.3-7.4, P < 0.001]. Significantly more participants returned to the ED with symptoms of AGE within 3 days if IV fluids were administered at the index visit [30/224 (13.4%) versus 88/1453 (6.1%), P < 0.001]. **Conclusion**: Higher CDS scores, antiemetic use, previous healthcare visits and country were independent predictors of IV rehydration which was also associated with increased ED revisits. Knowledge translation focused on optimizing the use of antiemetics (i.e. for those with dehydration) and reducing the geographic variation in IV rehydration use may improve the ED experience and reduce ED-revisits.
Keywords: gastroenteritis, intravenous, paediatric

LO35

Characterizing pain in children with acute gastroenteritis presenting to the emergency department

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Introduction: Although acute gastroenteritis is an extremely common childhood illness, there is a paucity of literature characterizing

the associated pain and its management. Our primary objective was to quantify the pain experienced by children with acute gastroenteritis in the 24-hours prior to emergency department (ED) presentation. Secondary objectives included describing maximum pain, analgesic use, discharge recommendations, and factors that influenced analgesic use in the ED. **Methods**: Study participants were recruited into this prospective cohort study by the Alberta Provincial Pediatric EnTeric Infection TEam between January 2014 and September 2017. This study was conducted at two Canadian pediatric EDs; the Alberta Children's Hospital (Calgary) and the Stollery Children's Hospital (Edmonton). Eligibility criteria included < 18 years of age, acute gastroenteritis (□ 3 episodes of diarrhea or vomiting in the previous 24 hours), and symptom duration □ 7 days. The primary study outcome, caregiver-reported maximum pain in the 24-hours prior to presentation, was assessed using the 11-point Verbal Numerical Rating Scale. **Results**: We recruited 2136 patients, median age 20.8 months (IQR 10.4, 47.4); 45.8% (979/2136) female. In the 24-hours prior to enrolment, 28.6% (610/2136) of caregivers reported that their child experienced moderate (4-6) and 46.2% (986/2136) severe (7-10) pain in the preceding 24-hours. During the emergency visit, 31.1% (664/2136) described pain as moderate and 26.7% (571/2136) as severe. In the ED, analgesia was provided to 21.2% (452/2131) of children. The most commonly administered analgesics in the ED were ibuprofen (68.1%, 308/452) and acetaminophen (43.4%, 196/452); at home, acetaminophen was most commonly administered (77.7%, 700/901), followed by ibuprofen (37.5%, 338/901). Factors associated with analgesia use in the ED were greater pain scores during the visit, having a primary-care physician, shorter illness duration, fewer diarrheal episodes, presence of fever and hospitalization. **Conclusion**: Although children presenting to the ED with acute gastroenteritis experience moderate to severe pain, both prior to and during their emergency visit, analgesic use is limited. Future research should focus on appropriate pain management through the development of effective and safe pain treatment plans.

Keywords: gastroenteritis, pain, pediatrics

LO36

Hyoscine butylbromide (Buscopan) for abdominal pain in children: a randomized controlled trial

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Introduction: Abdominal pain is one of the most frequent reasons for an emergency department (ED) visit. Most cases are functional and no therapy has proven effective. Our objective was to determine if hyoscine butylbromide (HBB) (BuscopanTM) is effective for children who present to the ED with functional abdominal pain. **Methods**: We conducted a randomized, blinded, superiority trial comparing HBB 10 mg plus acetaminophen placebo to oral acetaminophen 15 mg/kg (max 975 mg) plus HBB placebo using a double-dummy approach. We included children 8-17 years presenting to the ED at London Health Sciences Centre with colicky abdominal pain rated >40 mm on a 100 mm visual analog scale (VAS). The primary outcome was VAS pain score at 80 minutes post-administration. Secondary outcomes included adverse effects; caregiver satisfaction with pain management using a five-item Likert scale; recidivism and missed surgical diagnoses within 24-hours of discharge. Analysis was based on intention to treat. **Results**: We analyzed 225 participants (112 acetaminophen; 113 HBB). The mean (SD) age was 12.4 (3.0) years and 148/225 (65.8%) were females. Prior to enrollment, the median (IQR) duration of pain prior was 2 (4.5) hours and analgesia was provided to 101/225 (44.9%) of participants. The mean (SD) pre-intervention pain scores in the acetaminophen and HBB groups were 62.7 (15.9) mm and 60.3 (17.3) mm, respectively. At 80 minutes, the mean (SD) pain scores in the acetaminophen and HBB groups were 30.1 (28.8) mm and 29.4 (26.4) mm, respectively and there were no significant differences adjusting for pre-intervention scores (p = 0.96). The median (IQR) caregiver satisfaction was high in the acetaminophen [5 (2)] and HBB [5 (1)] groups (p = 0.79). The median (IQR) length of stay between acetaminophen [235 (101)] and HBB [234 (103)] was not significantly different (p = 0.53). The proportion of participants with a return visit for abdominal pain was 4/112 (3.5%) in the acetaminophen group and 6/113 (5.3%) in the HBB group. The most common adverse effect was nausea (9% in each group) and there were no significant differences in adverse effects between acetaminophen (26/112, 23.2%) and HBB (31/113, 27.4%) (p = 0.52). There were no missed surgical diagnoses. **Conclusion**: For children with presumed functional abdominal pain who present to the ED, both acetaminophen and HBB produce a clinically important (VAS < 30 mm) reduction in pain and should be routinely considered in this clinical setting.

Keywords: abdominal pain, Buscopan, paediatric

LO37

Prevalence of cigarette smoking amongst adult emergency department patients

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Introduction: Tobacco smoking is a priority public health concern, and a leading cause of death and disability globally. While the smoking prevalence in Canada is approximately 13-18%, the proportion of smokers among emergency department (ED) patients has been found to be significantly higher. This disparity primes the emergency department as a critical environment to provide smoking cessation counselling and support. **Methods**: A verbal questionnaire was administered to adult patients (18+) presenting to Royal University, Saskatoon City, and St. Paul's Hospital ED's. Patients were excluded if they were underage, too ill, or physically/mentally unable to complete the questionnaire independently. Patients' smoking habits were also correlated with Fagerstrom tobacco dependence scores, chief complaints, Canadian Triage Acuity Scale (CTAS) scores, and willingness to partake in ED specific cessation counselling. Data were analyzed using IBM SPSS software to determine smoking prevalence and compared to Statistics Canada data using chi-square tests. **Results**: In total, 1190 eligible patients were approached, and 1078 completed the questionnaire. Adult Saskatoon ED patients demonstrated a cigarette smoking prevalence of 19.6%, which is significantly higher than the general adult Saskatchewan public at 15.1% (p < 0.0001). Comparing smoking and non-smoking cohorts, there are no significant differences in CTAS scores (p = 0.60). Of the proposed cessation interventions, ED cessation counselling was most popular among patients (62.4%), followed by receiving a pamphlet (56.2%), and being contacted by a smokers' quit line (49.5%). Out of the smoking cohort, 51.4% indicated they want to quit smoking, and would be willing to partake in ED-specific cessation counselling, if available. Additionally, 88.1% of current smokers started smoking when they were less than 19

years old. **Conclusion**: The higher smoking prevalence demonstrated in ED patients highlights the need for a targeted intervention program that is feasible for the fast-paced environment. Quit attempts have been demonstrated to be more efficacious with repeated interventions, which could be achieved by training ED staff to conduct brief motivational interviews and faxing referrals to a smokers' quit line for follow-up. Furthermore, pediatric ED's could be a valuable location for cigarette smoking screening, as the majority began smoking in their adolescence.

Keywords: cigarette smoking, primary prevention, smoking cessation

LO38

Assessment of pain and provision of non-pharmacologic analgesia to children by prehospital providers in Southwestern Ontario: a cross-sectional study

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Introduction: There is abundant evidence that in children, assessment and pharmacologic treatment of pain by prehospital providers is suboptimal. Most paediatric calls are performed by primary care paramedics who are unable to administer pharmacologic analgesia to children but can administer non-pharmacologic therapies. We sought to describe the proportion of children provided non-pharmacologic analgesia by prehospital providers. **Methods**: We reviewed all ambulance call reports (ACR) of children age 0-17 years with an acutely painful condition (headache, abdominal pain, possible fracture, head/ears/eyes/nose/throat pain, back pain, and unclassified pain) who were transported to the Children's Hospital, London Health Sciences Centre between 2008 and 2017. We excluded ACRs lacking data pertaining to the primary outcome. Data collection was recorded by two blinded assessors using a study-specific ExcelTM sheet. The primary outcome was the proportion of children offered non-pharmacologic analgesia. We performed a hierarchical stepwise logistic regression on the primary outcome using covariates defined a priori: age, sex, visible deformity, documentation of pain score, and complaint. **Results**: Of 19782 ACRS, we report the preliminary results of 500 ACRs reviewed from Jan 1 to Feb 22, 2016. Of the 403 ACRs eligible for analysis, the median (IQR) age was 13 (8) years and 174 (43.2%) were females. 309/403 (76.7%) calls involved primary (as opposed to advanced) care paramedics. Pain assessments were performed in 171/403 (42.4%) calls, most commonly the 0-10 verbal numeric rating scale [128/171 (74.8%)] and the median (IQR) score was 7 (4) (n = 128). Non-pharmacologic analgesia was offered in 72/403 (17.9%) of calls, most commonly ice (37/72, 51%) and splint (29/72, 40%). In the multivariate model, significant predictors of non-pharmacologic analgesia included older age (OR 1.1; 95% CI: 1.1, 1.2; p = 0.01) and visible deformity (OR 8.2; 95% CI: 2.5, 30.2; p = 0.001). Sex (p = 0.62), documentation of pain score (p = 0.81), and complaint (p = 0.05) were not significant predictors. **Conclusion**: In this preliminary analysis, the provision of non-pharmacologic analgesia to children in Southwestern Ontario by prehospital providers was suboptimal despite moderate to severe levels of pain. Less than half of patients had pain assessments documented. There is a clear need for education surrounding pain assessment and non-pharmacologic analgesic options in children among prehospital providers.

Keywords: pain, pediatrics, prehospital

LO39

Systematic review of emergency department practice change interventions for improving asthma outcomes

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Introduction: Emergency departments (ED) play a vital role in asthma care for patients of all ages. Our objective was to review and synthesize all practice change interventions in ED settings that focused on improving the health outcomes of adults and children with asthma. **Methods**: This study was a systematic review adhering to the methods outlined by the Effective Practice and Organization of Care (EPOC) Cochrane Review Group. We developed a search strategy with a library scientist for the following databases: AMED, CINAHL, Embase, ERIC, MEDLINE, HealthStar, CENTRAL, DARE and Cochrane's EPOC and Airways registers. We also hand searched the Journal of Asthma, Pediatrics and Chest. Two reviewers independently reviewed titles, abstracts and full text using predetermined criteria. Data were extracted by two independent reviewers who used a structured abstraction form and assessed risk of bias. All discrepancies were resolved by consensus. **Results**: Our search strategy yielded 8,878 titles and abstracts for review. A total of 214 studies underwent full text screening and we extracted data from 27 studies. Risk of bias was judged as low in 10 studies, moderate in 8 studies and high in 9 studies. A range of interventions were employed, with education (n = 14) and reminders (n = 8) being the most prevalent. In pediatric settings, most studies targeted changing the behaviour of parents (n = 11). Four studies targeted health care providers and four studies targeted both providers and parents. We identified a major deficit in the use of behaviour change theory to guide intervention design. The most common primary outcomes of interest were unscheduled return visits (n = 14), primary care follow-up (n = 9), quality of life (n = 5) and ED length of stay (n = 4). We were not able to perform a meta-analysis due to heterogeneity in interventions and outcomes. **Conclusion**: Although we found a range of interventions used to improve asthma care in EDs, there was significant variation in reported primary outcomes. Both unscheduled return visits and primary care follow-ups, the most common primary outcomes, varied in the timeframe and manner in which they were collected. Most interventions were educational and based on an assumption that education would change behaviour. Future research in this ares would benefit from standardized outcome measures and intervention designs based upon models of behaviour change model.

Keywords: asthma, practice change

LO40

Services for emergency department patients experiencing early pregnancy complications: a survey of Ontario hospitals

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Introduction: Women experiencing complications of early pregnancy frequently seek care in the emergency department (ED), as most have not yet established care with an obstetrical provider. The primary objective of this study was to explore the services available (ED management, ultrasound access, and follow-up care) for ED patients experiencing early pregnancy loss or threatened early pregnancy loss in Ontario hospitals. **Methods**: The emergency medicine

chiefs of 71 Ontario hospital EDs with an annual census of more than 30,000 ED patient visits in 2017 were invited to complete a 30-item, online questionnaire using modified Dillman methodology. These hospitals constitute greater than 85% of the annual ED visits in Ontario, creating a sample reflective of the services available to most women older than 18 years old seeking care for early pregnancy complications in the province. **Results**: Respondents from 63 EDs across Ontario completed the survey (response rate 88.7%). Of the EDs surveyed, 34 (54.0%) reported they did not have access to early pregnancy clinic services for women who presented to the ED with early pregnancy complications that were safe to discharge home. At these hospitals, it was found that patients were followed up in 14 (41.2%) EDs for the same complications including pregnancy of unknown location and threatened abortion. Respondents also stated that radiologist-interpreted ultrasound was only available to 22 (34.9%) of hospital sites 24 hours a day, 7 days per week for women with early pregnancy complications. Of hospital site respondents, 55 (87.3%) reported point-of-care ultrasound (POCUS) use in the ED for patients with early pregnancy complications, and 27 (49.1%) reported the ED had access to transvaginal ultrasound probes for POCUS assessment by emergency physicians. Additionally, the proportion of ED physicians who were certified as Canadian Emergency Ultrasound independent practitioners ranged from 10% to 100%. **Conclusion**: The results of this study highlight the reliance of some hospitals on the ED to provide ongoing follow-up care to patients experiencing complications of early pregnancy. The lack of clinical resources and specialized personnel in Ontario hospital EDs makes supporting these women longitudinally unrealistic, exposing them to undue risk and complications.

Keywords: early pregnancy complications, ectopic pregnancy, miscarriage

LO41

Evaluating paramedic comfort, confidence, and cultural competency in providing care to trans populations in a provincial ambulance system

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Introduction: Close to 2 million transgender (trans) individuals live in the United States and Canada. Trans communities frequently report emergency care avoidance and negative health care experiences. Of note, there is currently no research on the paramedic perspective of caring for trans populations. Our objective was to explore paramedic comfort, confidence, and cultural competency in providing emergency care to trans individuals. **Methods**: A cross-sectional, semi-structured electronic survey was administered by email to paramedics registered with the College of Paramedics of Nova Scotia (n = 1225) from April 9th to May 7th, 2018. The survey included previously validated questions from other medical settings. Three survey reminders were sent at weekly intervals following survey initiation. A 4-point Likert scale and qualitative open-ended questions were included to evaluate paramedic comfort, confidence, and cultural competency. Descriptive statistics were used to describe respondent characteristics. Open ended questions pertaining to paramedic needs were evaluated using constant comparative analyses consisting of open coding to identify themes. **Results**: Of the 387 paramedics who participated (response rate = 32%), 77.8% (n = 301) worked ground ambulance in a mixed rural/urban location (32.6%, n = 126) within Nova Scotia (94.5%; n = 365). Most respondents were between the ages of 41-50 (29.5%; n = 114), with > 20 years' experience (25.1%; n = 97), and male sex assigned at birth (56.1%; n = 217). Over half (54.8%; n = 212) identified as cisgender men. The majority (66.1%; n = 256) reported caring for a patient who identified as trans. 74.7% (n = 289) have never had formal education on trans health. Only 4.1% (n = 16) felt very knowledgeable about providing optimal care to trans communities and 26.6% (n = 103) felt very comfortable in providing optimal care. Most (70%; n = 271) were interested in obtaining formal education. 41.9% (n = 162) reported observing transphobia in the work place. **Conclusion**: The frequency of trans patient contact by paramedics is perceived to be high. Although comfort and knowledge are relatively low and transphobia witnessed in the work place relatively high, there was strong interest and expressed need for education on trans related health.

Keywords: emergency medicine, paramedic, transgender

LO42

Is point-of-care ultrasound a reliable predictor of outcome during atraumatic, non-shockable cardiac arrest? A systematic review and meta-analysis

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Introduction: Point-of-Care Ultrasound (PoCUS) is being increasingly utilized during cardiac arrests for prognosis. Following the publication of recent studies, the goal of this study was to systematically review and analyze the literature to evaluate the accuracy of PoCUS in predicting return of spontaneous circulation (ROSC), survival to hospital admission (SHA), and survival to hospital discharge (SHD) in adult patients with non-traumatic, non- shockable out- of-hospital or emergency department cardiac arrest. **Methods**: A systematic review and meta-analysis was completed. A search of Medline, EMBASE, Cochrane, CINAHL, ClinicalTrials.gov and the World Health Organization Registry was completed from 1974 until August 24th 2018. Adult randomized controlled trials and observational studies were included. The QUADAS-2 tool was applied by two independent reviewers. Data analysis was completed according to PRISMA guidelines and with a random effects model for the meta-analysis. Heterogeneity was assessed using I-squared statistics. **Results**: Ten studies (1,485 participants) were included. Cardiac activity on PoCUS had a pooled sensitivity of 59.9% (95% confidence interval 36.5%-79.4%) and specificity of 91.5% (80.8%-96.5%) for ROSC; 74.7% (58.3%-86.2%) and 80.5% (71.7%-87.4%) for SHA; and 69.4% (45.5%-86.0%) and 74.6% (59.8%-85.3%) for SHD. The sensitivity of cardiac activity on PoCUS for predicting ROSC was 24.7%(6.8%-59.4%) in the asystole subgroup compared with 77% (59.4%-88.5%) within the PEA subgroup. Cardiac activity on PoCUS, compared to an absence had an odd ratio of 15.9 (5.9-42.5) for ROSC, 9.8 (4.9-19.4) for SHA and 5.7 (2.1-15.6) for SHD. Positive likelihood ratio (LR) was 6.65 (3.16-14.0) and negative LR was 0.27 (0.12-0.61) for ROSC. **Conclusion**: Cardiac activity on PoCUS was associated with improved odds for ROSC, SHA, and SHD among adults with non-traumatic asystole and PEA. We report lower sensitivity and higher negative likelihood ratio, but with greater heterogeneity compared to previous systematic reviews. PoCUS may

provide valuable information in the management of non-traumatic PEA or asystole, but should not be viewed as the sole predictor in determining outcomes in these patients.
Keywords: cardiac arrest, focused echocardiography, point-of-care ultrasound

LO43

Simulation curricular content in postgraduate emergency medicine: a multicenter delphi study

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Introduction: There is increasing evidence to support the integration of simulation into medical training; however, no national emergency medicine (EM) simulation curriculum currently exists. Using Delphi methodology, we aimed to identify and establish content validity evidence for EM curricular content best suited for simulation-based training to inform national postgraduate EM training. **Methods**: A national panel of experts in EM simulation-related education iteratively rated potential curricular topics, on a 4-point scale, to determine those best suited for simulation-based training. After each round, responses were analyzed and topics scoring <2/4 were removed. Remaining topics were resent to the panel for further ratings until consensus was achieved, defined as Cronbach $\alpha \geq 0.95$. At conclusion of the Delphi process, topics that were rated ≥3.5/4 were considered core curricular topics, while those rated 3.0-3.5 were considered extended curricular topics. **Results**: Forty-four experts from 13 Canadian centres participated. Two hundred and eighty potential curricular topics, in 29 domains, were generated from a systematic review of the literature, analysis of relevant educational documents and a survey of Delphi panelists. Three rounds of Delphi surveys were completed before consensus was achieved, with response rates ranging from 93-100%. Twenty-eight topics, in 8 domains, reached consensus as core curricular topics. An additional 35 topics, in 14 domains, reached consensus as extended curricular topics. **Conclusion**: Delphi methodology allowed for achievement of expert consensus and content validation of EM curricular content best suited for simulation-based training. These results provide a foundation for improved integration of simulation into postgraduate EM training and can be used to inform a national simulation curriculum to supplement clinical training and optimize learning.
Keywords: curriculum development, postgraduate education, simulation

LO44

Simulation in the continuing professional development of Canadian academic emergency physicians: a national survey

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Introduction: Capitalizing on the success of Simulation-Based Education (SBE) in residency-training programs, simulation has been gradually integrated into Continued Professional Development (CPD) programs for Emergency Physicians (EPs) in Canada. This study sought to characterize how Canadian academic emergency medicine (EM) departments have implemented SBE for CPD. **Methods**: We conducted two national surveys: 1) the National Faculty Simulation Status Assessment Survey, administered by telephone to the simulation directors (or equivalent) at 20 Canadian academic EM sites and 2) the Faculty Simulation Needs Assessment Survey administered online to all full-time EPs across 9 Canadian academic EM sites. **Results**: The response rates for the National Status and Needs Assessment Surveys were 100% (20/20), and 40% (252/635), respectively. The majority (60%) of Canadian academic EM sites reported utilizing SBE for CPD, though only 30% reported dedicated funding support. EPs reported participating in a median of 3 hours per year of SBE (IQR 1-6 hours). Reported incentivization offered in the form of continued medical education credits varied between simulation directors (67%) and EPs (44%). Simulation directors identified several significant barriers to SBE including a lack of faculty time, fear of peer judgment, and faculty inexperience. In contrast, EP-identified barriers included time commitments outside of shift, lack of opportunities, and lack of departmental. The three most common topics of interest for SBE by EPs were performance of rare procedures, pediatric resuscitation, and neonatal resuscitation. Interprofessional involvement in SBE CPD was valued by both simulation directors and EPs, with most EPs (79%) indicating it is useful. **Conclusion**: Most Canadian EPs and simulation directors recognize the value of SBE for CPD, yet it is only utilized, infrequently, by 67% of Canadian academic EM departments for this purpose. This may be explained, in part, by poor incentivization for participation. Simulation directors and EPs noted different barriers to SBE implementation for CPD suggesting the need for dialogue to improve utilization. As SBE for CPD is incorporated more frequently, and at more sites, content should be guided by local needs assessments with an emphasis on interprofessional participation.
Keywords: continuing professional development, emergency medicine, simulation

LO45

Simulation-based research in emergency medicine in Canada: priorities and perspectives

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Introduction: Simulation has assumed an integral role in the Canadian healthcare system with applications in quality improvement, systems development, and medical education. High quality simulation-based research (SBR) is required to ensure the effective and efficient use of this tool. This study sought to establish national SBR priorities and describe the barriers and facilitators of SBR in Emergency Medicine (EM) in Canada. **Methods**: Simulation leads (SLs) from all fourteen Canadian Departments or Divisions of EM associated with an adult FRCP-EM training program were invited to participate in three surveys and a final consensus meeting. The first survey documented active EM SBR projects. Rounds two and three established and ranked priorities for SBR and identified the perceived barriers and facilitators to SBR at each site. Surveys were completed by SLs at each participating institution, and priority research themes were reviewed by senior faculty for broad input and review. **Results**: Twenty SLs representing all 14 invited institutions

participated in all three rounds of the study. 60 active SBR projects were identified, an average of 4.3 per institution (range 0-17). 49 priorities for SBR in Canada were defined and summarized into seven priority research themes. An additional theme was identified by the senior reviewing faculty. 41 barriers and 34 facilitators of SBR were identified and grouped by theme. Fourteen SLs representing 12 institutions attended the consensus meeting and vetted the final list of eight priority research themes for SBR in Canada: simulation in CBME, simulation for interdisciplinary and inter-professional learning, simulation for summative assessment, simulation for continuing professional development, national curricular development, best practices in simulation-based education, simulation-based education outcomes, and simulation as an investigative methodology. **Conclusion**: Conclusion: This study has summarized the current SBR activity in EM in Canada, as well as its perceived barriers and facilitators. We also provide a consensus on priority research themes in SBR in EM from the perspective of Canadian simulation leaders. This group of SLs has formed a national simulation-based research group which aims to address these identified priorities with multicenter collaborative studies.

Keywords: emergency medicine, simulation

LO46

Lost to follow-up post-sexual and domestic assault: An evaluation of prevalence and correlates of cases presenting to the emergency department

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Introduction: Domestic violence (DV) and sexual assault (SA), together called sexual and gender-based violence (SGBV), are traumatic and life-changing events. Post-assault follow-up care is essential for survivor recovery through medical care, mental health functioning, and injury reassessment. The objective of this analysis was to determine the frequency of loss to follow-up (LTFU) in a SGBV population, and the characteristics most commonly associated with LTFU. **Methods**: The Sexual Assault and Partner Abuse Care Program (SAPACP) is the only Ottawa program for emergency/forensic care. Demographic and assault characteristics were abstracted from the SAPACP clinical case registry (1 Jan 2015 to 20 Dec 2017). Descriptive analyses and bivariable/multivariable logistic regression modelling assessed factors most strongly associated with LTFU using odds ratios (OR), adjusted OR (AOR), and 95% confidence intervals (CI). **Results**: Among 894 initial SAPACP visits, 482 (53.9%) were LTFU. Of those LTFU, 445 (92.3%) were female, 185 (38.4%) arrived by ambulance, 284 presented acutely (58.9%), 70 (14.5%) had substance use issues, and 82 (17.0%) were re-victimized. There were 229 (47.5%) sexual assaults, 201 (41.7%) physical assaults, and 92 (19.1%) verbal assaults. LTFU patients were more likely to arrive by ambulance (AOR: 1.09, 95% CI: 1.34-2.69), experience re-victimization (AOR: 1.94, 95% CI: 1.25-3.03), and have a substance use disorder (AOR: 1.67, 95% CI:1.02-2.73). Those more likely to attend follow-up included sexual assault survivors (AOR: 0.37, 95% CI: 0.27-0.50) and acute presenters (AOR: 0.58, 95% CI: 0.44-0.78). **Conclusion**: Over half of patients arriving for initial SAPACP visits did not follow-up. LTFU was more likely among cases that arrived by ambulance, and those involving revicitimization or substance use disorders. Follow-up is critical for maintaining mental and physical health post-trauma. While some characteristics increased follow-up likelihood, this study has identified groups that need attention to reduce LTFU.

Keywords: domestic violence, intimate partner violence, sexual assault

LO47

Concussions in minor hockey players before and after implementation of a policy to limit body checking

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Introduction: Concussions are one of the most common sports-related injuries presenting to emergency departments (EDs), and are particularly frequent among players of contact sports such as ice hockey (hockey). Studies of youth hockey players report increased concussion incidence when participating in levels of hockey that allow body-checking. In 2016, an Edmonton minor hockey organization implemented a policy to remove body checking from play for non-elite levels of Bantam (13-14 years) and Midget (15-17 years). This study aimed to evaluate the effect of this policy on occurrence of concussions in male minor hockey players. **Methods**: Alberta Health Services Sport and Recreation codes (SR = 54) were used to identify Bantam and Midget hockey players presenting to Edmonton Zone emergency departments (ED) during the 2013/2014 to 2016/2017 hockey seasons from the National Ambulatory Care Record System. Injured hockey players with a concussion were identified using International Classification of Diseases 10-CA diagnosis code S06.0. Odds ratios (OR) of concussions among total hockey injuries before (2013-2016) and after (2016-2017) the policy are reported with 95% confidence intervals (CIs). Differences were assessed using Pearson's $\chi 2$ test. **Results**: During the study period, 1978 minor hockey players presented to an Edmonton Zone ED with a hockey-related injury, including 272 players with a concussion (14%). Most of the injuries occurred to Midget players (n = 1274). The proportions of concussion were similar before and after the policy change for players of all ages (OR = 0.78; 95% CI: 0.37 to 0.92) and for injured Bantam players (OR = 0.97; 95% CI: 0.59 to 1.55); however, there was a significant reduction in concussions as a proportion of all injuries for Midget players before and after the policy change (OR = 0.61; 95% CI: 0.36 to 1.00). **Conclusion**: In the initial year of implementation, the policy to limit body-checking to elite levels of play had mixed results. While the policy change did not result in a significant reduction in concussions overall, or for Bantam players, Midget players did experience a significant reduction in concussions after the policy change. The reasons behind these age-related differences require further investigation. Moreover, further evaluation of the policy using additional years of post-policy data, as well as hockey registration numbers, is needed to evaluate the sustainability of its effect.

Keywords: concussion, sports injuries

LO48

Similarities and differences between sports and recreation-related concussions and concussions from non-sport activities

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Introduction: Patients with concussion often present to the emergency department (ED). Although sports and recreation (SR) activities account for less than half of all adult concussions, guidelines

developed for management of SR-related concussions (SRC) are widely used for all concussion patients. This study aimed to identify whether there are clinically relevant differences in patient and injury characteristics between SRC and those occurring outside of SR activities. **Methods**: Adults (>17 years) presenting from April 2013 to April 2015 with a concussion to one of three EDs with Glasgow coma scale score ≥13 were recruited by on-site research assistants. Data on patient characteristics (i.e., age, sex, employment, lifestyle, relevant medical history), ED presentation (i.e., EMS arrival, hours since injury, CTAS, Glasgow Coma Scale score) and injury characteristics (i.e., activity leading to injury, loss of consciousness [LOC], signs and symptoms [scored using the Rivermead Post-Concussion Questionnaire], and health-related quality of life [from the 12-Item Short Form Health Survey [SF-12]) were collected from structured interviews and the ED chart. Dichotomous and categorical variables were compared using Fisher's exact test; continuous variables were compared using t-tests or Mann-Whitney tests, as appropriate. **Results**: In total, 248 patients were enrolled (47% male, median [IQR] age: 35 [23, 49]). Patients with SRC were younger (median: 23.5 years vs 35 years; $p < 0.001$), more likely to be a student (31% vs 8%; $p > 0.001$), and more likely to exercise regularly (89% vs 66%; $p = 0.001$). Patients with SRC were less likely to present during the daytime (66% vs. 77%; $p = 0.022$), less likely to have a history of mental health issues (18% vs 33%; $p = 0.011$) and had significantly higher median SF-12 physical components scores (55.5 [IQR: 51.4 to 57.8] vs. 53.5 [IQR: 45.5 to 56.7]; $p = 0.025$). All other characteristics were similar between the two groups. **Conclusion**: Although differences in demographics and lifestyle have been identified between patients sustaining a SRC and those concussed during other activities, injury characteristics, such as presentation acuity, proxies for severity, and signs and symptoms, were similar in both groups. Further analysis to assess whether the demographic and lifestyle differences affect clinical outcomes, such as time to symptom resolution, between these two groups is required to assess if sport-based treatment guidelines are appropriate for all patients.

Keywords: concussion, emergency department, mild traumatic brain injury

LO49

Can the HINTS exam rule out stroke in those with vertigo? A systematic review and meta-analysis

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Introduction: Acute vestibular syndrome (AVS - vertigo, nystagmus, head motion intolerance, ataxia, and nausea/vomiting) is a subset of patients presenting with vertigo. They are most often due to benign vestibular neuritis but can be a sign of a vertebrobasilar stroke. The HINTS (head impulse test, nystagmus, positive test of skew) exam has been proposed as an extremely accurate bedside test to rule out stroke in those presenting with AVS. Is the HINTS exam compared to MRI sufficiently sensitive to rule out vertebrobasliar stroke in an adult population presenting to the emergency department with AVS. **Methods**: We searched in Pubmed, Medline, Embase, the Cochrane database, and relevant conference abstracts from 1968 to December 2018 and performed hand searches. No restrictions for language or study type were imposed. Relevant studies were reviewed and data was extracted by two independent reviewers. Gold standard in ruling out stroke was; Negative late acute (72 hrs–10d) cranial MRI with DWI OR Negative early acute (0–72hrs) cranial MRI plus negative follow-up cranial MRI or clinical follow-up for TIA/stroke of ≥3 months. Included studies were prospective or retrospective with patients presenting with acute vestibular syndrome. Studies combined if low clinical and statstitical heterogeonity. Study quality was assessed using the QUADAS tool. Random effects meta analysis using Revman 5 and SAS9.3 was performed. **Results**: 6 studies with 715 participants were included(QUADAS 12/14 SD 1.2). Average study length 5.3 years (STD 3.3 years) . Prevalence of vertebrobasilar stroke ranged 9.3-76% (Mean 39.1% SD 17.1). The most common diagnosis were vertebrobasilar stroke (Mean 34.8% SD 17.1%), peripheral cause (Mean 30.9% SD 16%). Intra cerebral haemorrhage (Mean 2.2%, SD 0.5%). Neurologist/neuro ophthalmologist performed the exam in 5/6 studies. 1 study reported a kappa between emergency medicine physician and neurologist of 0.24-0.41. The HINTS exam had a sensitivity of 96% (CI 95% 0.92-0.98, I2-0%), Specificity 91.4% (CI 95% 64.5-98.4% I2 94%). Positive likelihood ratio 11.9 (CI 95% 2.9-48.8) and a negative likelihood ratio of 0.04 (CI 95% 0.01– 0.14). **Conclusion**: The HINTS exam has excellent diagnostic accuracy for ruling out stroke when performed by a neurologist. The lack of ER proven diagnostic accuracy and high prevalence of serious diagnosis in those presenting with acute vestibular syndrome suggests care should be taken in ruling out central cause of dizziness in this population.

Keywords: head impulse test, nystagmus, positive test of skew (HINTS), vertigo

LO50

Can clinical examination alone rule out a central cause for acute dizziness?

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Introduction: The vast majority of patients presenting with dizziness to the emergency department (ED) are due to a benign self-limiting process. However, up to 5% have a serious central neurological cause. Our goal was to assess the sensitivity of clinical exam for a central cause in adult patients presenting to the emergency department with dizziness. **Methods**: At a tertiary care ED we performed a medical records review (Sep 2014- Mar 2018) including adult patients with dizziness (vertigo, unsteady, lightheaded), excluding those with symptoms >14days, recent trauma, GCS < 15, hypotensive, or syncope/loss of consciousness. 5 trained reviewers used a standardized data collection sheet to extract data. Individual patient data were linked with the Institute of Clinical Evaluation Science (ICES) database. Our outcome was a central cause defined as: ischemic stroke (IS), transient ischemic attack (TIA), brain tumour, intra cerebral haemorrhage (ICH), or multiple sclerosis (MS) diagnosed on either neurology assessment, computed tomography, magnetic resonance imaging, or diagnostic codes related to central causes found within ICES. A sample size of 1,906 was calculated based on an expected prevalence of 3% with an 80% power and 95% confidence interval to detect an odds ratio greater than 2. Univariate analysis and logistic regression were performed. **Results**: 3,109 were identified and 2,307 patients included (mean 57 years SD ± 20, Female 59.1%, Kappa 0.91). 62 central causes (IS 56.5%, TIA 14.5%, Tumour 11.3%, MS 9.7%, ICH 6.5%) of dizziness were identified. Imaging was performed in 945(42%) and neurology assessment in 42 (1.8%). ICES yielded no new diagnoses of a central cause for dizziness. Multivariate logistic regression found 11

high-risk findings associated with a central cause; history of IS/TIA (OR 3.8 95%CI 1.7-8.2), cancer (OR 3.2 95%CI 1.4-7.2), dyslipidemia (OR 2.3 95%CI 1.2-4.4), symptoms of visual changes (OR 2.1 95%CI 1.5-6.3), dysarthria (OR 9.1 95%CI 3-27.4), vomiting (OR 2 95%CI 1-3.7), motor deficit (OR 7.7 95%CI 2.9-20.2), sensory deficit (OR 28.9 95%CI 7.4-112.9), nystagmus (OR 3.3 95%CI 1.6-6.7), ataxia (OR 2.5 95%CI 1.3-4.9) and unable to walk 3 steps unaided (OR 3.4 95%CI 1.4-8.5). Absence of these findings had a sensitivity of 100% (95%CI 92.5-100%) for ICH, IS, Tumour and 95.2% (86.5-98.9) if including TIA and MS. Specificity was 51.5% (95% CI 49.4-53.6%). **Conclusion**: Clinical exam is highly sensitive for identifying patients without a central etiology for their dizziness.
Keywords: clinical exam, decision aid, vertigo

LO51

Does my dizzy patient need a computed tomography of the head?

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Introduction: Dizziness is among the most common presenting complaints in the emergency department (ED). Although the vast majority of these cases are the result of a benign, self-limiting process, many patients undergo computed tomography (CT) of the head. The objective of this study was to define the yield of and diagnostic accuracy of CT in dizziness in addition to defining high-risk clinical features predictive of an abnormal CT. **Methods**: At a tertiary care ED we performed a medical records review from Jan 2015-2018 including adult patients with a triage complaint of dizziness (vertigo, unsteady, lightheaded), excluding those with symptoms >14days, recent trauma, GCS < 15, hypotensive, or syncope/loss of consciousness. Five trained reviewers used a standardized data collection sheet to extract data. Our outcome was a central cause defined as: cerebrovascular accident (CVA), brain tumor (BT) or intracranial haemorrhage (ICH) diagnosed on CT or magnetic resonance imaging. Univariate analysis/logistic regression were performed and odds ratios reported. A sample size of 796 was calculated based on an expected prevalence of 5% with an 80% power and 95% confidence interval to detect an odds ratio greater than 2. **Results**: 2310 patients were recruited, 800 (35%) underwent CT head, 471(59%) female and a mean age of 62.8 years (+/−17.5 years). The top three diagnoses for patients undergoing CT were peripheral vertigo/benign positional vertigo (153 – 19%), vertigo not-otherwise-specified (137 – 17%) and dizziness not-otherwise-specified (137 – 17%). The number of CT scans considered abnormal was 30 (3.7%). The top three diagnoses for patients with an abnormal CT were CVA (22 – 75%), BT (9 – 26%) and ICH (6-17%). High risk clinical findings associated ($p < 0.001$) with an abnormal head CT were dysmetria, objective motor neurological signs, positive Rhomberg, ataxia and inability to walk 3 steps. Objective motor neurological signs (OR 8.4 [95% CI 3.27-21.72]) and ataxia (OR 3.4 [95% CI 1.62-7.41]) were both independently associated with an abnormal CT. Patients without any high risk findings on exam had a 0.7%(3/381 – 2 CVA,1 Tumour) probability of an abnormal CT. Sensitivity of CT for a central cause of dizziness was 71.43%(95%CI 55.4-84.3%), specificity 100%(95%CI 99.5-100%). **Conclusion**: Current rate of imaging in dizziness is high and inefficient. CT should be the first imaging test in those with high-risk clinical features, but a normal result does not rule out a central cause.
Keywords: cerebrovascular accident, computed tomography, vertigo

LO52

Classification versus prediction of mortality using the Systemic Inflammatory Response score and quick Sepsis-related Organ Failure Assessment scores in patients with infection

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Introduction: Despite their widespread use, measures of classification accuracy (i.e. sensitivity and specificity) have several limitations that conceals relevant information and may bias decision-making. Assessing the predictive ability of clinical tools instead may provide more useful prognostic information to support decision-making, particularly in an Emergency setting. We sought to contrast classification accuracy versus predictive ability of the Systemic Inflammatory Response Syndrome (SIRS) and quick Sepsis-related Organ Failure Assessment (qSOFA) Sepsis scores for determining mortality risk among patients with infection transported by paramedics. **Methods**: A one-year cohort of patients with infections transported to the Emergency Department by paramedics was linked to in-hospital administrative databases. Hospital mortality was determined for each patient at the time of discharge. We calculated sensitivity and specificity of SIRS and qSOFA for classifying hospital mortality across different score thresholds, and estimated discrimination (assessed using the C statistic) and calibration (assessed visually) of prediction. Prediction models for hospital mortality were constructed using the aggregated SIRS or qSOFA scores for each patient as a predictor, while accounting for clustering by institution and adjusting for differences in patient age and sex. Predicted and observed risk were plotted to assess calibration and change in risk across levels of each score. **Results**: A total of 10,409 patients with infection who were transported by paramedics were successfully linked, with an overall mortality rate of 9.2%. The median SIRS score among non-survivors was 2, while the median qSOFA score was 1. SIRS score had higher sensitivity estimates than qSOFA for classifying hospital mortality at all thresholds (0.11 – 0.83 vs. 0.08 – 0.80), but the qSOFA score had better discrimination (C statistic 0.76 vs. 0.71) and calibration. The risk of hospital mortality predicted by the SIRS score ranged from 6.6-24% across score values, whereas the risk predicted by the qSOFA score ranged from 8.6-53%. **Conclusion**: Assessing the SIRS and qSOFA scores predictive ability reveals that the qSOFA score provides more information to clinicians about a patient's mortality risk despite having worse sensitivity. This study highlights important limitations of classification accuracy for diagnostic test studies and supports a shift toward assessing predictive ability instead. Character count 2490
Keywords: diagnostic accuracy, risk prediction, sepsis

LO53

The correlation of workplace-based assessments with periodic performance assessment of emergency medicine residents

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Introduction: Competency-based medical education (CBME) relies on pragmatic assessment to inform trainee progression decisions. It is unclear whether face-to-face workplace-based assessment (WBA) scoring by faculty reflects their true perception of trainee competence, as many factors influence individual assessments. To better defend competence committee decisions, it is critical to understand how

accurately WBAs reflect the faculty's honest perception of resident competence and entrustment. **Methods**: To best capture faculty perception of trainee competence, we created a periodic performance assessment (PPA) tool for anonymous faculty assessment of residents after repeated clinical interactions. PPA surveys were distributed to full-time EM faculty at a single Canadian FRCPC-EM training site. Faculty were asked to score residents on entrustable professional activities (EPAs) based on encounters over the previous 6-months, and were advised that all data would be anonymized. All WBA scores for FRCPC-EM residents (N = 21) were collected from the 6-months preceding PPA completion. Analysis compared paired WBA and PPA entrustment scores for an individual resident, faculty, and EPA using Wilcoxon Signed Ranks tests and Spearman correlations. Data were analyzed across faculty, EPAs, and both faculty and EPA. **Results**: About half (17/33) of all invited full-time EM faculty participated. Overall, anonymous PPAs had a significantly lower mean score compared to face-to-face WBAs (3.61-3.69 vs. 3.92-4.06, $p < 0.001$ for all) across all groupings. Individual WBAs had a low-moderate correlation with individual PPAs (rho = 0.44). When scores were averaged across 1) faculty or 2) EPA, there was an increase in correlation, but it remained moderate (rho = 0.53 and 0.54, respectively). When scores were averaged for an individual resident across 3) faculty and EPA, there was a strong correlation between WBA and PPA (rho = 0.86). **Conclusion**: There is only moderate correlation between an individual faculty's WBAs and their anonymous longitudinal entrustment for a given resident on a specific EPA. These results may signal caution when interpreting WBA scores in the context of high stakes decisions. Aggregated scores from multiple faculty and/or multiple EPAs substantially increased the correlation between WBA and PPA. These findings highlight the importance of using aggregated WBA scores across multiple assessors and EPA for high-stakes resident progression decisions, to minimize the noise and bias in individual assessment.

Keywords: competency-based medical education, periodic performance assessment, workplace-based assessment

LO54

The CanadiEM Junior Editor program: a quantitative study and program evaluation

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Introduction: CanadiEM.org is a multi-author open access medical education website which aims to improve emergency care in Canada by building an online community of practice for healthcare practitioners and providing them with high quality, freely available educational resources. It is used by physicians, allied health professionals, and trainees globally. Junior (medical student and/or resident) Editors are key members of the community who are mentored to advance their academic skills and knowledge for their careers and the healthcare field. The program also aims to increase the sustainability of the CanadiEM project by supporting the creation and publishing of online content. We aimed to assess the impact and efficacy of this program while discovering ways to improve it. **Methods**: The experience of all current and previous Junior Editors were assessed through a survey developed by the authorship team for this purpose. The survey consisted of 48 questions, including 15 multiple choice questions rated using a Likert Scale, 10 open-ended questions, and 23 demographic or binary yes/no questions. The participants' perceptions of their experience, desire for future involvement, and opinions regarding implementation of the program at other medical education websites were assessed using open-ended qualitative questions. These responses were thematically analyzed. **Results**: A total of 28 Junior Editors responded (71.7% of those surveyed). They listed their responsibilities as uploading/copyediting posts, authorship of posts, infographic creation, social media promotion, authorship of podcast summaries, editing of podcasts, and logo design. Results revealed a positive experience across all domains, with participants citing a better experience when compared to previous similar roles. 85.7% (24/28) stated they achieved their expectations from the program, and 82.1% (23/28) would incorporate this program into another medical education website if given the opportunity. **Conclusion**: Junior Editors reported positive experiences across all responsibilities, with particular value placed on digital and authorship skills development, inspiration for future FOAMed, research engagement, and mentorship/networking. Through collaboration with current team members, we will implement improvement initiatives. Based upon these results, we believe that the Junior Editor model may also be viable within other medical education communities.

Keywords: free open access medical education, medical education, program evaluation

LO55

Signal & noise – do professionalism concerns impact decision-making of competence committees?

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Introduction: Competence committees (CCs) struggle with incorporating professionalism issues into resident progression decisions. This study examined how professionalism concerns influence individual faculty decisions about resident progression using simulated CC reviews. **Methods**: In 2017, the investigators conducted a survey of 25 program directors of Royal College emergency medicine residency training programs in Canada and those faculty members who are members of the CCs (or equivalent) at their home institution. The survey contained twelve resident portfolios, each containing formative and summative information available to a CC for making progression decisions. Six portfolios outlined residents progressing as expected and six were not progressing as expected. Further, a professionalism variable (PV) was added to six portfolios, evenly split between those residents progressing as expected and not. Participants were asked to make progression decisions based on each portfolio. **Results**: Raters were able to consistently identify a resident needing an educational intervention versus those who did not. When a PV was added, the consistency among raters decreased by 34.2% in those residents progressing as expected, versus increasing by 3.8% in those not progressing as expected ($p = 0.01$). **Conclusion**: When using an unstructured review of a simulated resident portfolio, individual reviewers can better discriminate between trainees progressing as expected when professionalism concerns are added. Considering this, educators using a competence committee in a CBME program must have a system to acquire and document professionalism issues to make appropriate progress decisions.

Keywords: education, professionalism, residency

LO56

Measuring cognitive load on shift: Application of cognitive load theory during clinical work in the emergency department

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Introduction: By virtue of the nature of their work, emergency medicine physicians and residents experience high cognitive load and stress, which are known to affect physician performance and patient outcomes. However, the contribution of cognitive load has not previously been measured during the clinical work of emergency physicians. The objectives of this study were to measure cognitive load and stress in emergency physicians and residents during clinical work, evaluate the relative contribution of multiple factors on cognitive load, and to determine the effect of experience on these results. **Methods**: This observational study was conducted at an academic Canadian Urgent Care Centre from July to August 2018. Emergency medicine residents and staff physicians completed a survey while on shift to evaluate measures of cognitive load and acute stress. Patient acuity and the number of active patients for each physician, hours worked and patients in the waiting room were recorded. Correlational analyses and multivariable linear regression were performed to evaluate the effect of each predictor on measures of overall cognitive load. **Results**: A total of 131 questionnaires were completed by 42 physicians (87 questionnaires from 26 staff physicians and 44 questionnaires from 16 residents). Results showed that staff physicians carried a significantly higher patient load compared to residents ($p < 0.001$). There were no differences in mean overall cognitive load ($p = 0.25$), acute stress ($p = 0.17$) or measured subcomponents of cognitive load between the two groups. Perceived case difficulty and acute stress were strong predictors of overall cognitive load, while level of distraction did not correlate with the other outcomes. The number of patients in the waiting room predicted acute stress in staff physicians, while the number of higher acuity patients was a significant predictor in residents. **Conclusion**: Measures of overall cognitive load and acute stress were strongly correlated in the clinical setting. Different factors affect cognitive load and acute stress in staff physicians compared to residents. Appreciating these differences may help medical educators understand the cognitive challenges faced by learners in a clinical context, and aid in the design of cognitive and educational strategies to help mitigate these challenges and reduce stress.

Keywords: acute stress, cognitive load, emergency medicine

LO57

Twitter as an educational tool for medical students in their emergency medicine rotation: a prospective cohort study

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Introduction: Different tools have been developed to complement medical training, and improve student learning. Although social media has been described as an innovative educational strategy, evidence for its use is scarce in emergency medicine (EM). The primary outcome of this study was to evaluate whether brief teaching points (tweets) sent to medical students (MS) via a Twitter feed, would yield better exam score at the end of an emergency medicine (EM) rotation. **Methods**: Participants included in this prospective cohort study were MS completing an EM rotation at our tertiary care academic center. The control group was recruited from December 2016 to November 2017 and the experimental group from November 2017 to November 2018. The MS in the experimental group were invited to follow a Twitter feed. A total of 32 EM-related tweets based on learning objectives were sent out throughout the 4 week rotation. At the end of the rotation, MS of both cohorts took an exam and completed a survey of assiduity and appreciation. Exam scores were compared using t-tests. **Results**: A total of 80 MS were recruited for the study, 38 in the experimental cohort. Average exam scores were similar in both cohorts (control = 63 ± 9% vs experimental = 64 ± 8% for a mean difference of -2% [95%CI -6 to 2], $p = 0.37$). Of the experimental group, only 7 (18%) of the participants reported viewing more than 50% of the tweets. There was no difference between mean exam scores of this sub-group and that of the control cohort (66 ± 10% for a mean difference of 4% [95%CI -4 to 11], $p = 0.33$). The majority ($n = 20$, 53%) of the MS in the experimental cohort did not read any tweets. When compared to the rest of the experimental cohort MS who reported viewing ≥50% of the tweets found the Twitter feed to be a useful educational tool. Indeed, on a 3 item Likert scale used to evaluate different aspects of appreciation, they found the Twitter feed to be beneficial to their rotation (86% vs 13%, $p < 0.001$) as well as helpful in patient management (71% vs 16%, $p = 0.001$). These same MS would have liked more tweets (100% vs 19%, $p < 0.001$) and would like to use Twitter in other rotations (100% vs 32%, $p = 0.005$). **Conclusion**: In this study, there was no difference in the exam scores between MS having access to regular EM-focused educational tweets in comparison to those who did not. Results also found a lower than expected assiduity of MS to the educational Twitter feed, although those who used it significantly found it useful.

Keywords: medical students, social media, Twitter

LO58

An education needs assessment: how can we optimize the education provided to off-service residents completing an emergency medicine rotation

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Introduction: Over 150 Off Service Residents from 18 different programs rotate through our ED every academic year. We aim to determine the educational needs of these residents to we better design a curriculum for their ED rotation. **Methods**: We conducted a cross-sectional convenience sample survey of 133 Off-Service PGY-2 residents who had rotated through the ED of The Ottawa Hospital in their PGY-1 year. (from July 2016 to June 2017). The survey was emailed to residents from March to May 2018 and consisted of 19 questions. Questions were qualitative, selection from list and rank order. They focused on 3 main areas: EM rotation impact and areas for improvement, desired content, desired method of learning. Data was collected using Survey Monkey. **Results**: We received 70 responses (53%) from 13 different residency programs. 36 (51.4%) of respondents were from the Family Medicine program. Qualitative themes included that the ED provides great opportunity to develop the ability to workup undifferentiated patients and allows for teaching around cases. Allowing more involvement in acute care cases and having more SIM sessions could improve the rotation. The most useful topic was chest pain/cardiovascular conditions (73.3% of residents) with 16 additional ED topics listed as important for their practice. The most useful skill was suturing (51.6% of residents) with 16 other ED procedures listed as important for their practice. The preferred teaching method was SIM (48.3%) followed by small group

teaching (33.3%). **Conclusion**: The emergency department provides an excellent learning environment for a large range of Off-Service residents early in their training. In addition to clinical shifts, a curriculum incorporating simulation and small group teaching and that covers a large scope of topics is necessary to meet the needs of these residents.
Keywords: emergency medicine rotation, innovations in EM research, off-service resident

LO59

Retention of critical procedural skills post-simulation training: a systematic review

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Introduction: Short-term gains in knowledge and skills of critical emergency procedures are demonstrated after simulation, but there is uncertainty regarding long term retention. Our objective was to determine whether simulation of critical emergency procedures promotes long term retention of procedural skills in non-surgical physicians likely to perform them. **Methods**: MEDLINE and Embase (from start of database to June 2018) and the CENTRAL Trials Registry of the Cochrane Collaboration (May 2018 Issue) were searched using a peer-reviewed strategy. Studies were eligible if they (1) were observational cohorts, quasi-experimental or randomized controlled trials, (2) assessed intubation, cricothyrotomy, periocardiocentesis, tube thoracostomy or central line placement performance by non-surgical physicians, (4) utilized any form of simulation (all levels of realism and technology), and (4) assessed skill performance immediately after and at ≥3 months post-simulation. There was no language restriction. Two reviewers independently assessed article eligibility. One reviewer extracted data and assessed study quality. Primary outcome was skill performance 3 months post-simulation. Secondary outcomes included skill performance at 6 and ≥12 months post-simulation, and skill competency at 3 months post-simulation. **Results**: 1370 citations were identified. 12 studies were eligible. Methodological quality was uniformly poor with high risk of bias, lack of defined primary outcomes, inadequate sample sizes, and non-standardized, unvalidated tools of unclear clinical significance. Given significant heterogeneity in design, populations, procedures, and outcome timing, a narrative synthesis of results was undertaken. In 10 studies participants' performance at 3, 6 and 12 months retention testing remained above baseline assessment. However, 3 studies showed a significant decrease in performance at 3 months post-simulation compared to immediately post-simulation. Performance was also lower in 2 studies at 6 months post-simulation, and 2 studies at ≥12 months post-simulation. Four studies assessed competency and 3 demonstrated maintenance of competency. **Conclusion**: There was significant heterogeneity and poor methodological quality among the eligible studies. Results were conflicting for retention of procedural skills and competency. Future directions should include development of robust assessment tools, and improved research methodology of simulation education targeted at critical procedural skills.
Keywords: competency, critical skill, retention

LO60

Health research methodology education in Canadian emergency medicine residency programs: a national survey of curriculum assessment

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Introduction: With a shift towards competency-based medical education, it is crucial to not only emphasize learner abilities such as clinical skills but also leadership in the conduct of research. Though the Royal College of Physicians and Surgeons of Canada's (RCPSC) training objectives for Emergency Medicine (EM) residents state that the specialist physician be able to describe the principles of research, the research methodology curriculum across EM training programs in Canada is likely variable. The primary goal of this study was to describe the variability of research methodology teaching among RCPSC-EM residency programs. **Methods**: An electronic survey was distributed to English-speaking RCPSC-EM program directors (PDs) and EM residents. The survey investigated residents' and PDs' thoughts on the adequacy of their local curriculum and asked them to quantify their research methodology teaching. The primary outcome was the frequency and content of current research methodology and research ethics teaching as well as a description of scholarly project requirements of EM residency programs across Canada. The data was presented with simple descriptive statistics. **Results**: 79 EM residents and 7 PDs responded (response rate 22.3% and 58.3%, respectively). All 7 PDs indicate having a research methodology curriculum while 71.6% of residents are aware of this curriculum. Only 57.1% of PDs report having formal assessments. Most programs (71.4%) teach via small groups while 28.6% of programs use large group sessions. Residents identify teaching as led by research staff (68.9%), staff physicians (60%), and EM researchers (57.8%), while only 17.8% use outside educators. Students noted various modalities of curriculum feedback such as online surveys, weekly forms, and verbal feedback. Regarding the strength of the curricula, 85.7% of PDs believed their curriculum prepares residents for board exams, while only 62.2% of residents felt similarly. When asked about using a standard web-based curriculum module if available, 60.5% of residents responded in favour. **Conclusion**: This study demonstrates that EM residency programs across Canada vary with respect to research methodology curriculum and discrepancies exist between residents' and program directors' perceptions of the curriculum. Given the lack of a standardized research methodology curriculum for these residency programs, there is an opportunity for curriculum development to improve training in research methodology.
Keywords: curriculum assessment, research methodology, residency education

LO61

A national needs assessment on quality improvement and patient safety education in Canadian emergency medicine residency programs

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Introduction: Quality improvement and patient safety (QIPS) are increasingly recognized as integral to the provision and advancement of emergency medicine (EM) care. In 2015, QIPS were added to the Canadian Medical Education Directives for Specialists (CanMEDS) framework. However, the level of QIPS education and support that Canadian EM residents receive is unknown. In order to better plan national QIPS efforts aimed at enabling EM residents to improve their local care settings, we sought to assess the current state of QIPS education and support in Canadian EM residency programs.

Methods: This was a descriptive, cross-sectional electronic survey that was disseminated to all current Canadian EM residents from both Royal College (RC) and Family Medicine - EM training streams. Residents were recruited either directly or through their program's administrative assistant. The survey consisted of multiple-choice, Likert and free-text entry questions. Themes included a) familiarity with QIPS; b) local opportunities for QIPS projects and mentorship; and c) desire for further QIPS education and involvement. The survey was open for a five-week period, with formal reminders after the first and third weeks. Descriptive statistics are reported. **Results**: 189 (35%) of 535 current EM residents completed the survey, representing all 17 medical schools. 77% of respondents were from the RC stream. 54.7% of respondents reported being "somewhat" or "very" familiar with QIPS. 47.2% of respondents reported "not knowing" or "not having readily available" QIPS projects to participate in their local environment, and 51.5% had equivalent responses with respect to QIPS mentorship opportunities. Only 17.5% of respondents reported that QIPS methodologies were already formally taught in their residency program, and 66.9% indicated a desire for increased QIPS teaching. The majority of respondents were "slightly" (35.9%), "moderately" (23.2%) or "very" (11.3%) interested in becoming involved with QIPS training and initiatives. **Conclusion**: Responding Canadian EM residents are interested in obtaining greater QIPS education as well as project and mentorship opportunities, but many perceive that they do not have adequate access to these at the current time. As the importance of QIPS increases in the EM community, supporting residents with more robust educational infrastructures may be necessary. Future efforts may include the standardizing of QIPS postgraduate curricula and improving access to QIPS opportunities across the country.

Keywords: medical education, patient safety, quality improvement

LO62

Intranasal dexmedetomidine for procedural distress in children: a systematic review and meta-analysis

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Introduction: Intranasal dexmedetomidine (IND) is an emerging agent for procedural distress in children. However, studies to date have been limited by small samples and imprecise estimates of effect size. We sought to summarize the evidence on the effectiveness of IND for procedures associated with distress in children. **Methods**: We performed electronic searches of MEDLINE (1946-2018), EMBASE (1980-2018), Google Scholar (2018), CINAHL (1981-2018), Cochrane Central Register of Controlled Trials (2018), 6 clinical trials registries and conference proceedings (2010-2018). Title searches, data abstraction, and risk of bias assessments were performed in duplicate. We included all published and unpublished, randomized and quasi-randomized trials of IND for procedures in children younger than 19 years of age without language restriction. The methodological quality of studies was evaluated using the Cochrane Collaboration's Risk of Bias tool. The primary outcome was the proportion of participants that were deemed to be adequately sedated for the procedure. **Results**: Of 661 studies, 18 met inclusion criteria. Trials involved 2128 participants, age 1 month - 14 years (836, 39.3% females), who received IND 1 - 4 mcg/kg either by drops (n = 12), atomizer (n = 4), or both (n = 2). 12 trials were eligible for meta-analysis. 13 trials used validated instruments to assess sedation. All studies except one were associated with low or moderate risk of bias. For painful procedures (IV insertion; laceration repair; dental extraction), the pooled OR (95% CI) for adequate sedation and need for additional analgesia was non-significant [1.19 (0.53, 2.65)] and [2.16 (0.62, 7.49)], respectively (n = 5). For non-painful procedures (diagnostic imaging), the corresponding pooled OR (95% CI) favored IND [3.04 (1.58, 5.82)] and [4.44 (2.11, 9.35)], respectively (n = 7). Time to onset and duration of sedation ranged from 13-31 minutes and 41-91.5 minutes, respectively. For adverse effects, the pooled OR (95% CI) was not significantly different between IND and comparators [0.58 (0.22, 1.55] and there were no serious adverse events. **Conclusion**: IND at doses 1 to 4 mcg/kg are safe and adequately sedate children undergoing non-painful procedures, although the ease of administration must be weighed against the risk of prolonged sedation. Additional trials with larger sample sizes and greater methodologic rigor are needed for painful emergency department procedures such as laceration repair and IV insertion.

Keywords: dexmedetomidine, intranasal, sedation

LO63

Humanoid robot-based distraction to reduce pain and distress during venipuncture in the pediatric emergency department: A randomized controlled trial

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Introduction: Intravenous insertion (IVI) is identified by children as extremely painful and the resultant distress can have lasting negative consequences. There is an urgent need to effectively manage such procedures. Our primary objective was to compare the pain and distress of IVI with the addition of humanoid robot-based distraction to standard care, versus standard care alone. **Methods**: This two-armed randomized controlled trial (RCT) was conducted from April 2017 to May 2018 at the Stollery Children's Hospital emergency department (ED). Children aged 6 to 11 years who required IVI were included. Exclusion criteria included hearing or visual impairments, neurocognitive delays, sensory impairment to pain, previous enrolment, and discretion of the ED clinical staff. Primary outcomes were measured using the Observational Scale of Behavioural Distress-Revised (OSBD-R) (distress) and the Faces Pain Scale-Revised (FPS-R) (pain). A total of 426 pediatric patients were screened and 340 were excluded. **Results**: We recruited 86 children, of which 55% (47/86) were male; 9% (7/82) were premature at birth; 82% (67/82) had a previous ED visit; 30% (25/82) required previous hospitalization; 78% (64/82) had previous IV placement and 96% (78/81) received topical anesthesia. The mean total OSBD-R score was 1.49 ± 2.36 (standard care) compared to 0.78 ± 1.32 (robot group) ($p = 0.047$). The median FPS-R during the IV procedure was 4 (IQR 2,6) in the standard care group alone, compared to 2 (IQR 0,4) with the addition of humanoid robot-based distraction ($p = 0.10$). Change in parental state anxiety pre-procedure versus post-procedure was not significantly different between groups ($p = 0.49$). Parental satisfaction with the IV start was 93% (39/42) in the robot arm compared to 74% (29/39) in the standard care arm ($p = 0.03$). Parents were also more satisfied with management of their child's pain in the robot group (95% very satisfied) compared with standard care (72% very satisfied) ($p = 0.002$). **Conclusion**: A statistically significant reduction in distress was observed with the

addition of robot-based distraction to standard care. Humanoid robot-based distraction therapy reduces distress and to a lesser extent, pain, in children undergoing IVI in the ED. Further trials are required to confirm utility in other age groups and settings.
Keywords: distraction, intravenous, pain

LO64

The HEART score in predicting major adverse cardiac events in patients presenting to the emergency department with possible acute coronary syndrome: a systematic review and meta-analysis

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Introduction: Acute coronary syndrome (ACS) is a common, sometimes difficult to diagnose spectrum of diseases. Given the diagnostic challenge, it is sensible for emergency physicians to have an approach to prognosticate patients with possible ACS. The objective of this review was to investigate the ability of the HEART score to predict major adverse cardiac events (MACE) in patients presenting to the ED with possible ACS. **Methods**: Eleven databases and other sources identified 468 potentially relevant studies. Sixty-seven studies underwent full text review with 25 studies meeting eligibility criteria. Main outcome measures were pooled prevalence, risk ratio (RR), and absolute risk reduction (ARR) for MACE within six weeks of ED evaluation, comparing HEART score 0–3 versus 4–10. Model discrimination (sensitivity, specificity, concordance statistic) and calibration (observed to expected events ratio) were also evaluated. **Results**: Data from 25 studies including 41,397 patients were combined in the meta-analysis. In total, 4815 patients (11.6%) developed MACE. Among 18,866 patients with HEART score 0–3, 396 (2.1%) developed MACE (RR 0.08; ARR 0.20). Outcome measures were consistent across planned subgroup and sensitivity analyses. Among studies with secondary outcome data for patients with HEART score 0–3, 5 of 6461 (0.1%) died and 75 of 7556 (1.0%) had a myocardial infarction. **Conclusion**: The HEART score provides a reliable quantitative risk assessment of MACE in ED patients with possible ACS. Emergency clinicians should consider using the HEART score to facilitate risk communication and shared decision making with patients and other care providers.
Keywords: acute coronary syndrome, chest pain, prognosis

LO65

Frailty and associated outcomes among emergency department patients requiring endotracheal intubation

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Introduction: Risk-stratification of patients requiring endotracheal intubation and mechanical ventilation in the Emergency Department (ED) is necessary for informed discussions with patients regarding goals-of-care. Frailty is a clinical state characterized by reduced physiologic reserve, and resulting from accumulation of physiological stresses and comorbid disease. Frailty is increasingly being identified as an important independent predictor of outcome among critically ill patients. Our objective was to identify the impact of clinical frailty (defined by the Clinical Frailty Scale [CFS]) on in-hospital mortality and resource utilization of ED patients requiring endotracheal intubation and mechanical ventilation. **Methods**: We analyzed a prospectively collected registry (2011-2016) of patients requiring endotracheal intubation in the ED at two academic hospitals and six community hospitals. We included all patients ≥18 years of age, who survived to the point of ICU admission. All patient information, outcomes, and resource utilization were stored in the registry. CFS scores were obtained through chart abstraction by two blinded reviewers. The primary outcome, in-hospital mortality, was analyzed using a multivariable logistic regression model, controlling for confounding variables (including patient sex, comorbidities, and illness severity). We defined "frailty" as a CFS ≥ 5. **Results**: 4,622 patients were included. Mean age was 61.2 years (SD: 17.5), and 2,614 (56.6%) were male. Frailty was associated with increased risk of in-hospital mortality, as compared to those who were not frail (adjusted odds ratio [OR] 2.21 [1.98-2.51]). Frailty was also associated with higher likelihood of discharge to long-term care (adjusted OR 1.78 [1.56-2.01]) among patients initially from a home setting. Frail patients were more likely to fail extubation during their hospitalization (adjusted OR 1.81 [1.67-1.95]) and were more likely to require tracheostomy (adjusted OR 1.41 [1.34-1.49]). **Conclusion**: Presence of frailty among ED patients requiring endotracheal intubation and mechanical ventilation was associated with increased in-hospital mortality, discharge to long-term care, extubation failure, and tracheostomy. ED physicians should consider the impact of frailty on patient outcomes, and discuss associated prognosis with patients prior to intubation.
Keywords: critical care, intubation, mechanical ventilation

LO66

Solid organ donation from the emergency department: A death review

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Introduction: A significant gap exists between the number of people waiting for an organ and donors. There are currently 1,628 people awaiting organ donation in Ontario alone. In 2018 to date, 310 donors have donated 858 organs. The purpose of this study was to determine whether there were missed donors in the Emergency Department (ED) and by what percent those missed donors would increase organ donation overall. **Methods**: This was a health records and organ donation database review of all patients who died in the ED at a large academic tertiary care center with 2 campuses and 160,000 visits per year. Patients were included from November 1, 2014 – October 31, 2017. We collected data on demographics, cause of death, and suitability for organ donation. Data was cross-referenced between hospital records and the provincial organ procurement organization called Trillium Gift of Life Network (TGLN) to determine whether patients were appropriately referred for consideration of donation in a timely manner. Potential missed donors were manually screened for suitability according to TGLN criteria. We calculated simple descriptive statistics for demographic data and the primary outcome. The primary outcome was percentage of potential organ donors missed in the Emergency Department (ED). **Results**: There were 606 deaths in the ED from November 1, 2014 – October 31, 2017. Patients were an average of 71 years old, 353 (58%) were male, and 75 (12%) died of a traumatic cause. TGLN was not contacted in 12 (2%) of cases. During this period there were two donors from the ED and 92 from the ICU. There were ten missed potential donors. They were an average of 67 years,

7 (70%) were male, and 2 (20%) died of a traumatic cause. In all ten cases, patients had withdrawal of life sustaining measures for medical futility prior to TGLN being contacted for consideration of donation. There could have been an addition seven liver, six pancreatic islet, four small bowel, and seven kidney donors. The ten missed ED donors could have increased total donors by 11%. **Conclusion**: The ED is a significant source of missed organ donors. In all cases of missed organ donation, patients had withdrawal of life sustaining measures prior to TGLN being called. In the future, it is essential that all patients have an organ procurement organization such as TGLN called prior to withdrawal of life sustaining measures to ensure that no opportunity for consideration of organ donation is missed.
Keywords: donation, organ

LO67

Association between hypotension and mortality in critically ill patients with severe traumatic brain injury: experience at a single Canadian trauma center

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Introduction: Hypotension is known to be associated with increased mortality in severe traumatic brain injury (TBI) patients. Systolic blood pressure (SBP) of <90 mmHg is the threshold for hypotension in consensus TBI treatment guidelines; however, evidence suggests hypotension should be defined at higher levels for these patients. Our objective was to determine the influence of hypotension on mortality in TBI patients requiring ICU admission using different thresholds of SBP on arrival at the emergency department (ED). **Methods**: Retrospective cohort study of patients with severe TBI (Abbreviated Injury Scale Head score ≥3) admitted to ICU at the QEII Health Sciences Centre (Halifax, Canada) between 2002 and 2013. Patients were grouped by SBP on ED arrival (<90 mmHg, <100 mmHg, <110 mmHg). We performed multiple logistic regression analysis with mortality as the dependent variable. Models were adjusted for confounders including age, gender, Injury Severity Score (ISS), injury mechanism, and trauma team activation (TTA). **Results**: A total of 1233 patients sustained a severe TBI and were admitted to the ICU during the study period. The mean age was 43.4 ± 23.9 years and most patients were male (919/1233; 74.5%). The most common mechanism of injury was motor vehicle collision (491/1233; 41.2%) followed by falls (427/1233; 35.8%). Mean length of stay in the ICU was 6.1 ± 6.4 days, and the overall mortality rate was 22.7%. SBP on arrival was available for 1182 patients. The <90 mmHg group had 4.6% (54/1182) of these patients; mean ISS was 20.6 ± 7.8 and mortality was 40.7% (22/54). The <100 mmHg had 9.3% (110/1182) of patients; mean ISS was 19.3 ± 7.9 and mortality was 34.5% (38/110). The <110 mmHg group had 16.8% (198/1182) of patients; mean ISS was 17.9 ± 8.0 and mortality was 28.8% (57/198). After adjusting for confounders, the association between hypotension and mortality was 2.22 (95% CI 1.19-4.16) using a <90 mmHg cutoff, 1.79 (95% CI 1.12-2.86) using a <100 mmHg cutoff, and 1.50 (95% CI 1.02-2.21) using a <110 mmHg cutoff. **Conclusion**: While we found that TBI patients with a SBP <90 mmHg were over 2 times more likely to die, patients with an SBP <110 mmHg on ED arrival were still 1.5 times more likely to die from their injuries compared to patients without hypotension. These results suggest that establishing a higher threshold for clinically meaningful hypotension in TBI patients is warranted.

Keywords: hypotension, mortality, traumatic brain injury

LO68

Does point-of-care ultrasonography change actual care delivered by shock subcategory in emergency department patients with undifferentiated hypotension? An international randomized controlled trial from the SHoC-ED investigators

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Introduction: Although use of point of care ultrasound (PoCUS) protocols for patients with undifferentiated hypotension in the Emergency Department (ED) is widespread, our previously reported SHoC-ED study showed no clear survival or length of stay benefit for patients assessed with PoCUS. In this analysis, we examine if the use of PoCUS changed fluid administration and rates of other emergency interventions between patients with different shock types. The primary comparison was between cardiogenic and non-cardiogenic shock types. **Methods**: A post-hoc analysis was completed on the database from an RCT of 273 patients who presented to the ED with undifferentiated hypotension (SBP <100 or shock index > 1) and who had been randomized to receive standard care with or without PoCUS in 6 centres in Canada and South Africa. PoCUS-trained physicians performed scans after initial assessment. Shock categories and diagnoses recorded at 60 minutes after ED presentation, were used to allocate patients into subcategories of shock for analysis of treatment. We analyzed actual care delivered including initial IV fluid bolus volumes (mL), rates of inotrope use and major procedures. Standard statistical tests were employed. Sample size was powered at 0.80 (α:0.05) for a moderate difference. **Results**: Although there were expected differences in the mean fluid bolus volume between patients with non-cardiogenic and cardiogenic shock, there was no difference in fluid bolus volume between the control and PoCUS groups (non-cardiogenic control 1878 mL (95% CI 1550 – 2206 mL) vs. non-cardiogenic PoCUS 1687 mL (1458 – 1916 mL); and cardiogenic control 768 mL (194 – 1341 mL) vs. cardiogenic PoCUS 981 mL (341 – 1620 mL). Likewise there were no differences in rates of inotrope administration, or major procedures for any of the subcategories of shock between the control group and PoCUS group patients. The most common subcategory of shock was distributive. **Conclusion**: Despite differences in care delivered by subcategory of shock, we did not find any significant difference in actual care delivered between patients who were examined using PoCUS and those who were not. This may help to explain the previously reported lack of outcome difference between groups.
Keywords: hypotension, point of care ultrasound, shock

LO69

A retrospective cohort study on the impact of point-of-care ultrasound on radiologic imaging in patients presenting to the emergency department with suspected uncomplicated renal colic

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Introduction: The number of CT scans prescribed in the Emergency department (ED) for suspected renal colic has increased over recent years without an associated improvement in patient-centred outcomes. We assessed whether Point-of-Care Ultrasound (PoCUS) decreases the use of formal radiologic imaging. **Methods**: We completed a retrospective cohort study on consecutive patients 18 years of age and older presenting to the ED with suspected uncomplicated renal colic in a tertiary care centre in Québec in 2016. Exclusion criteria included: previous urologic intervention, solitary kidney, dialysis, fever, pyuria, acute kidney injury, pregnancy, suspicion of a serious alternative diagnosis or persistent symptoms despite analgesia. We compared the proportion (95%CI) of formal radiologic imaging performed (Ultrasound or CT) in patients who had PoCUS in the ED vs. those who did not. Two-tailed Fisher exact test ($\alpha = 0.05$) and odds ratios (95%CI) calculated from multivariate logistic regression models adjusted for age, gender, Charlson Index and previous renal colic were used to compare the two groups. The reliability of data collection was evaluated with a kappa score (95%CI). **Results**: 169 patients with uncomplicated renal colic were included. There was no difference between the groups in terms of age, gender, Charlson Index, or previous renal colic. The PoCUS level of training and the doctor's education level was significantly higher in the PoCUS group. There was a non-significant trend towards less formal imaging in patients of the PoCUS group 65/88 (73.9% [63.4-82.7%]) vs. the non-PoCUS group 69/81 (85.2% [75.6-92.1%]), p = 0.087. After adjustment for confounders, the patients not evaluated with PoCUS were more likely to have formal imaging with a significant odds ratio of 2.41 [1.05-5.56]). Among patients who underwent a CT, incidentalomas were found in 16.5% and only 2.0% demonstrated significant findings leading to changes in ED management, such as an alternative diagnosis, need for admission, or an urgent urological intervention. Inter-observer agreement was excellent between assessers with a kappa score of 0.88 [0.66-1.00]. **Conclusion**: ED patients with uncomplicated renal colic who are investigated with PoCUS tend to have fewer formal imaging test. When CT scans were performed, incidentalomas were found in 16.5% and ED management changed only 2.0% of the time. PoCUS appears to be a useful tool for decreasing CT utilisation in this low-risk ED population.

Keywords: computed tomography, point-of-care ultrasound (PoCUS), renal colic

LO70

Functional & cognitive decline in older delirious adults after an emergency department visit

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Introduction: While negative consequences of incident delirium on functional and cognitive decline have been widely studied, very limited data is available regarding functional and cognitive outcomes in Emergency Department (ED) patients. The aim of this study was therefore to evaluate the impact of ED stay-associated delirium on older patient's functional and cognitive status at 60 days post-ED visit. **Methods**: This study is a planned sub-analysis of a large multicentre prospective cohort study (the INDEED study). This project took place between March and July of the years 2015 and 2016 within 5 participating EDs across the province of Quebec. Independent non-delirious patients aged □65, with an ED stay at least 8hrs were monitored until 24hrs post-ward admission. A 60-day follow-up phone assessment was also conducted. Participants were screened for delirium using the validated Confusion Assessment Method (CAM) and the severity of its symptoms was measured using the Delirium Index. Functional and cognitive status were assessed at baseline as well as at the 60-day follow-up using the validated OARS and TICS-m. **Results**: A total of 608 patients were recruited, 393 of which completed the 60-day follow-up. Sixty-nine patients obtained a positive CAM during ED-stay or within the first 24 hours following ward admission. At 60-days, those patients experienced a loss of 3.1 (S.D. 4.0) points on the OARS scale compared to non-delirious patients who lost 1.6 (S.D. 3.0) (p = 0.03). A significant difference in cognitive function was also noted at 60-days, as delirious patients' TICS-m score decreased by 2.1 (S.D. 6.2) compared to non-delirious patients, who showed a minor improvement of 0.5 (S.D. 5.8) (p = 0.01). **Conclusion**: People who developed ED stay-associated delirium have lower baseline functional and cognitive status than non-delirious patients and they will experience a more significant decline at 60 days post-ED visit.

Keywords: cognitive decline, delirium, functional decline

LO71

Evaluating the application of the prehospital Canadian C-Spine Rule by paramedics in sport-related injuries

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Introduction: The Canadian C-Spine rule (CCR) was validated for use by paramedics to selectively immobilize stable trauma patients. However, the CCR "Dangerous Mechanism" is highly prevalent in sports. Our objective was to compare the CCR performance in sport-related vs. non-sport-related injuries and describe sport-related mechanisms of injury. **Methods**: We reviewed data from the prospective paramedic CCR validation and implementation studies in 7 Canadian cities, which already included identification of sport-related injuries. A single trained reviewer further categorized mechanisms of injury using a pilot-tested standardized form, with the aid of a sport medicine physician in 15 ambiguous cases. We compared the CCR's recommendation to immobilize sport-injured versus non-sport-injured patients using chi-square and relative risk statistics with 95% confidence intervals. **Results**: There were 201 amateur sport-injuries among the 5,978 patients. Sport-injured patients were younger (mean age 36.2 vs. 42.4) and more predominantly male (60.5% vs 46.8%) than non-sport-injured patients. Paramedics did not miss any c-spine injuries when using the CCR. Although cervical spine injury rates were similar between sport (2/201; 1.0%) and non-sport injured patients (47/5,777; 0.8%), the absolute number of sport-related injuries was very small. Although CCR recommended immobilization equally between the two groups (46.4% vs 42.5% p = 0.29; RR 1.17 95%CI 0.87-1.57), the reason for immobilization was more likely to be a dangerous mechanism in sport injuries (68.6% vs 54.5%, p = 0.012). Although we observed a wide range of mechanisms, the most common dangerous mechanism responsible for immobilization in sport was axial load. **Conclusion**: The CCR identified all significant c-spine injuries in a cohort of patients assessed and transported by paramedics. Although an equal proportion of sport and non-sports related injuries were immobilized, a dangerous mechanism was most often responsible for immobilization in sport-related

cases. These findings do not address the potential impact of using the CCR to evaluate all sport-related injuries in collegiate or pro athletes evaluated by sport medicine therapists and physicians, as these patients are rarely assessed by paramedics or transported to a hospital. It does support the safety and benefit of using the CCR in sport-injured patients for which paramedics are called.
Keywords: cervical spine, pre-hospital, sports

LO72
Assessing non-technical skills in prehospital ad hoc team resuscitation
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Introduction: Successful resuscitation in the ED cannot occur without a viable patient, and in many cases patient viability is dependent upon optimal prehospital resuscitation performed by ad hoc teams formed in real time. Currently, little is known about the cognitive and interpersonal skills, or non-technical skills, that are essential for effective team collaboration under these conditions. We have completed a scoping review to provide a state of the literature and develop a taxonomy of the non-technical skills pertinent to ad hoc teams in prehospital settings. **Methods**: Our scoping review searched four databases (EMBASE, Medline, Cinahl, and Psychinfo) for articles related to resuscitation in acute care settings. No date criteria were applied, but only full text articles written in English were included. Articles underwent two-reviewer title & abstract screening, full text screening, and analysis. A quality review asked three questions: Are keywords defined? Is the article well-situated within the existing literature? Does the article contribute back to the existing body of knowledge? Although statistical analyses are not appropriate for this scoping review, analysis included a descriptive-analytical framework for organizing data. **Results**: Of 6932 screened articles, 38 were included in analysis, five articles examined prehospital teams, and one addressed the ad hoc nature of these teams. Only one of these articles met our three quality criteria. Nevertheless, our analysis suggests a rudimentary taxonomy whereby the primary objective of a team leader is to overcome this barrier by facilitating the development of optimal team situational awareness, fostered through timely and accurate briefings with closed-loop communication. **Conclusion**: This scoping review has identified that non-technical skills pertaining to resuscitation in acute care settings are becoming a widely examined phenomenon; however, few studies contribute in any meaningful way to our understanding of how non-technical skills training can be tailored to those performing as members of ad hoc prehospital resuscitation teams. As the need for interprofessional training is becoming more pressing, we anticipate this review will provide essential guidance for future inquiry as well as design for both educational models and organizational systems-based interventions.
Keywords: non-technical skills, prehospital, resuscitation

LO73
The state of the evidence for emergency medical services care of adult patients with sepsis: an analysis of appraised research from the Prehospital Evidence-Based Practice (PEP) program
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Introduction: The Prehospital Evidence-Based Practice (PEP) program is an online, freely accessible, continuously updated Emergency Medical Services (EMS) evidence repository. This summary describes the research evidence for the identification and management of adult patients suffering from sepsis syndrome or septic shock. **Methods**: PubMed was searched in a systematic manner. One author reviewed titles and abstracts for relevance and two authors appraised each study selected for inclusion. Primary outcomes were extracted. Studies were scored by trained appraisers on a three-point Level of Evidence (LOE) scale (based on study design and quality) and a three-point Direction of Evidence (DOE) scale (supportive, neutral, or opposing findings based on the studies' primary outcome for each intervention). LOE and DOE of each intervention were plotted on an evidence matrix (DOE x LOE). **Results**: Eighty-eight studies were included for 15 interventions listed in PEP. The interventions with the most evidence were related to identification tools (ID) (n = 26, 30%) and early goal directed therapy (EGDT) (n = 21, 24%). ID tools included Systematic Inflammatory Response Syndrome (SIRS), quick Sequential Organ Failure Assessment (qSOFA) and other unique measures. The most common primary outcomes were related to diagnosis (n = 30, 34%), mortality (n = 40, 45%) and treatment goals (e.g. time to antibiotic) (n = 14, 16%). The evidence rank for the supported interventions were: supportive-high quality (n = 1, 7%) for crystalloid infusion, supportive-moderate quality (n = 7, 47%) for identification tools, prenotification, point of care lactate, titrated oxygen, temperature monitoring, and supportive-low quality (n = 1, 7%) for vasopressors. The benefit of prehospital antibiotics and EGDT remain inconclusive with a neutral DOE. There is moderate level evidence opposing use of high flow oxygen. **Conclusion**: EMS sepsis interventions are informed primarily by moderate quality supportive evidence. Several standard treatments are well supported by moderate to high quality evidence, as are identification tools. However, some standard in-hospital therapies are not supported by evidence in the prehospital setting, such as antibiotics, and EGDT. Based on primary outcomes, no identification tool appears superior. This evidence analysis can guide selection of appropriate prehospital therapies.
Keywords: emergency medical services, prehospital medicine, sepsis

LO74
Exploring emergency physicians' ability to predict patient admission and decrease consultation to admission time
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Introduction: Delay of hospital admission until completion of assessment by consultants is a major contributor to emergency department (ED) crowding. We measured emergency physicians' (EP) ability to predict patient admission, and estimated potential time saved if EPs could request a bed at the time of consultation. **Methods**: This is a prospective cohort study in a tertiary care center over 4 months using a convenience sample of ED patients requiring consultation. We consecutively recruited patients from purposefully selected shifts to balance day of the week and time of day. We excluded patients younger than 18 years or those likely to be admitted (traumas, strokes, STEMI codes, and CTAS1). We asked EPs to predict patient disposition (admission or alternate disposition) just before consultation. We defined admission as: admission to any service, admission within 48 hours of ED discharge, patients held overnight without bed request, or if bed request was delayed by 12 or more hours, and alternate disposition as any other disposition. We present EP prediction test

characteristics using sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) with 95% confidence intervals (CI). The potential time saved was calculated from consultation to bed request for admitted patients. **Results**: Characteristics for the 454 included patients were: mean age 60.1 years, 48.4% male, 46.9% evening presentation, 69.4% were admitted (most commonly by Internal Medicine 26.9%), and median consult to bed request time was 3.5 hours (interquartile range 2.0 – 5.3 hours). Overall EP prediction sensitivity, specificity, PPV and NPV were 90.5% (95% CI 86.7-93.5), 84.2% (95%CI 77.0-89.8), 92.8% (95%CI 89.8-95.0) and 79.6% (95%CI 73.4-84.7) respectively. In other words, EPs correctly predicted 92.8% of patient admissions. The PPV for Internal Medicine was 95.7% (95%CI 89.7-98.4) and ranged from 78.9% (95%CI 53.9-93.0) for Psychiatry to 100% (95%CI 78.1-100) for Family Medicine. A total of 1113.5 hours of ED stretcher time (37.1 hours per shift) could have been saved if EPs initiated a concurrent bed request at time of consultation. **Conclusion**: EPs correctly predicted 92.8% of patient admissions across a broad field of disciplines. We estimate 1113.5 hours of ED stretcher time could have been saved over the study period if EPs triggered an inpatient bed request at the time of consultation, rather than waiting for the consultants' disposition decision.

Keywords: admission delay, crowding

LO75

The impact of snowfall on patient attendance at an urban academic emergency department

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Introduction: Accurate forecasting of emergency department (ED) patient visits can inform better resource matching. Calendar variables such as day of week and time of day are routinely used as predictors of ED volume. Further improvement in forecasting will likely come from dynamic variables. The effect of snowfall on ED volumes in colder climates remains poorly understood. We sought to determine whether accounting for snowfall improves ED patient volume forecasting. Our secondary objective was to characterize the magnitude of effect of snowfall on ED volume. **Methods**: This was a retrospective observational study using historical patient volume data and local snowfall records from April 1st, 2011 to March 31st, 2018 (2,542 days) at a single urban ED. We fit a series of four generalized linear models: a baseline model which included calendar variables and three different snowfall models which contained the variables in the baseline model plus an indicator variable for modelling snowfall. Each snowfall model had a different daily threshold for its indicator variable: any snowfall (>0cm), moderate snowfall (> = 1 cm), or high snowfall (> = 5 cm). We modeled daily ED volume as the dependent variable using a Poisson distribution. To evaluate model fit, we examined the Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) in each of the four models. In both cases, a lower number indicates better model fit. Incident rate ratios were calculated to determine the effect of snowfall. We used the delta method to calculate confidence intervals. **Results**: A total of 2542 days were used to develop the model. All three snowfall models demonstrated improved model fit compared to the baseline model with lower AIC and BIC values. The best fitting model included a binary variable for moderate snowfall (> = 1cm/day). This model showed a statistically significant decrease in ED volume of 2.65% (95% CI: 1.23% -4.00%) on snowfall days, representing 5.4 (95% CI: 2.5 -8.2) patients per day at our hospital with an average daily volume of 205 patients. **Conclusion**: The addition of a snowfall variable results in improved forecasting model performance in ED volume forecasting with optimal threshold set at 1 cm of snow in our setting. Snowfall is associated with a modest, but statistically significant reduction in ED volume.

Keywords: forecasting, patient volume, weather

LO76

Impact of high emergency department occupancy on time to physician initial assessment: a traffic theory analysis

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Introduction: Emergency department (ED) congestion is an ongoing threat to quality care. Traditional measures of ED efficiency use census and wait times over extended time intervals (e.g. per year, per day), failing to capture the hourly variations in ED flow. Borrowing from the traffic theory framework used to describe cars on a freeway, ED flow can instead be characterized by three fundamental parameters: flux (patients traversing a care segment per unit time), density (patients in a care segment per unit time), and duration (length of stay in a care segment). This method allows for the calculation of near-instantaneous ED flux and density. To illustrate, we examined the association between stretcher occupancy and time to physician initial assessment (PIA), seeking to identify thresholds where flux and PIA deteriorate. **Methods**: We used administrative data as reported to government agencies for 115,559 ED visits from April 1, 2014 to March 31, 2016 at a tertiary academic hospital. Time stamps collected at triage, PIA, and departure were verified by nosologists and used to define two care segments: awaiting assessment or receiving care. Using open-source software developed in-house, we calculated flow measures for each segment at 90-minute intervals. Graphical analysis was supplemented by regression analysis, examining PIA times of high (CTAS 1-3) or low (CTAS 4-5) acuity patients against ED occupancy (=density/staffed stretchers) adjusting for the day of the week, season and fiscal year. **Results**: At occupancy levels below 50%, PIA times remain stable and flux increases with density, reflecting free flow. Beyond 50% occupancy, PIA times increase linearly and flux plateaus, indicating congestion. While PIA times further deteriorate above 100% occupancy, flow is maintained, reflecting care delivery in non-traditional spaces (e.g. hallways). An inflection point where flux decreased with increased crowding was not identified, despite lengthening queues. **Conclusion**: The operational performance of a modern ED can be captured and visualized using techniques borrowed from the analysis of vehicular traffic. Unlike cars on a jammed roadway, patients behave more like a compressible fluid and ED care continues despite high degrees of crowding. Nevertheless, congestion begins well below 100% occupancy, presumably reflecting the need for stretcher turnover and saturation in subsegmental work processes. This methodology shows promise to analyze and mitigate the many factors contributing to ED crowding.

Keywords: congestion, flow, traffic

LO77

Assessing the long-term emergency physician resource planning for Nova Scotia, Canada

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Introduction: Planning for the future emergency physician (EP) workforce will be a significant challenge for decision makers given the rise in emergency department (ED) visits and no concurrent increase in resident positions. EP workforce planning must incorporate physician supply, as well as current and forecasted patient demand. Nova Scotia has undertaken the process of developing a planning model to support policy decision making. We hypothesize that Nova Scotia will require increased resident positions and recruitment from other provinces to meet future patient demand. **Methods**: We have developed an age structured population model that tracks the number of clinical full-time equivalent (FTE) EPs by their age and shows the "variance" (i.e., supply – demand = variance) over a 30 year planning horizon. This model represents all Level 1, 2, 3, and 4 EDs in Nova Scotia. Current physician supply was calculated based on FTE staffing levels. The current patient demand was based on historical volume and acuity of patients and converted to an FTE demand estimate. Forecasted demand was predicted to increase at an average rate of 0.5% per year. We varied the number of residents trained and the number of EPs recruited from outside the province to examine the effect on the EP workforce. Our initial model will reflect the current training environment and will be referred to as the "current state". In our 3 scenarios, we increased the number of residents and recruited physicians by 50%, individually and then together. Our outcome measure will be the variance in FTE. **Results**: The current state showed that the province will have a deficit of 51 FTE EPs over the next 30 years. In scenario 1, a 50% increase in both resident training streams eliminated all variance, while in scenario 2, the increase in recruitment reduced the FTE variance to 34 FTE positions unfilled. In scenario 3, the variance was 0. **Conclusion**: We feel that this CTAS weighted volumes perspective is important for clinical services planning but the siting, sizing, and synergizing of EDs in a region will involve other inputs. Its important to recognize that we have made the assumption that all physicians starting to work in Nova Scotia will be a 1 FTE. Future iterations will examine the effect of more realistic FTE definitions that account for administrative, teaching and research activities.

Keywords: emergency department staffing, emergency physician, health human resource planning

LO78

A qualitative evaluation of a mandatory provincial program auditing emergency department return visits

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Introduction: The Ontario emergency department (ED) Return Visit Quality Program (RVQP) launched in 2016 and aims to promote continuous quality improvement (QI) in the province's largest EDs. The program mandates routine audits of cases involving patients who had ED return visits within 72hrs that led to admission to hospital, in order to identify quality issues that can be tackled through QI initiatives. Our objective was to formally evaluate how well the RVQP achieved its aim of promoting continuous QI at participating sites using the constructivist grounded theory. **Methods**: Using a semi-structured interview guide, we employed a maximum variation sampling approach to ensure diverse representation across several geographical and institutional experiences (e.g., urban vs. rural, academic vs. community). Selected RVQP program leads were invited to participate in a phone interview to yield maximal insight, additionally using a snowball sampling approach to reach non-lead physicians to capture the penetration of the program. Interviews were conducted until thematic saturation was reached and no new insights were gleaned. Interviews were initially cross-performed by two members of the research team, recorded, transcribed, and de-identified. Data analysis was conducted using a constant comparative approach through the development of a coding framework and triangulation with the respondents' ED setting. We then grouped, compared and refined our analytic categories through an inductive, iterative approach. **Results**: Between June and August 2018, we interviewed 32 participants, including 21 RVQP program leads and 11 non-lead physicians, from a total of 23 diverse sites (out of 84). Our analysis suggests that the RVQP provides a structured method for EDs to frame the continuous collection of data in order to channel activities towards quality improvement projects based on identified needs. Success factors included: greater involvement with QI processes prior to the RVQP leading to more openness to improvement, a more collaborative approach to RVQP implementation which led to greater front-line workers' understanding and engagement, and more resources dedicated to implementing the RVQP as well as tackling the quality issues it identified. **Conclusion**: This study evaluated the impact of an innovative and large-scale program aimed at improving the culture of quality in Ontario EDs. While the program is still relatively new, early results show that there are key elements of EDs that support building a culture of QI.

Keywords: audit & feedback, quality improvement, return visits

LO79

The impact of access block on consultation time in the emergency department

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Introduction: Access block (AB) is the most important indicator of Emergency Department (ED) crowding, but the impact of AB on consultation time has not been described. Our objectives were to determine if ED AB affects inpatient service consultation time, and operational and patient outcomes. **Methods**: We conducted a health records review of all ED patients referred and admitted at a university-affiliated tertiary care hospital over 60-days. A computational algorithm determined hourly ED AB at the time of consultation request, and observational cohorts were determined based on ED AB high (>35% ED bed capacity occupied by admitted patients) or low (<35%). The outcomes included total consultation time (TCT), ED physician initial assessment (PIA) time, ED length of stay (LOS), transfer time to inpatient bed (TTB), hospital LOS, return to ED (RTED) within 30 days, and 30-day mortality. **Results**: We included 2,871 patients (48% male; M = 63 years, IQR 45–78), and the low AB cohort were higher acuity (N = 1,692; 50.4% CTAS 1–2) than the high AB cohort (N = 1,179; 47.1% CTAS 1–2). Median TCT was not significantly different (low = 209min, high = 212min; p = 0.09), and there was no difference in consults completed within the 3-hour institutional time target (low = 41.1%, high = 40.9%; p = 0.89). Median ED PIA time was not significantly different (low = 66min, high = 68min; p = 0.08), however, patients seen within the funding-associated provincial ED PIA time target was significantly less during high AB (high = 82.2%, low = 89.2%; p < 0.001). Median ED LOS was significantly longer during high AB (high = 12.1hr,

low = 11.1hr; p = 0.009), but median hospital LOS was not different (high = 109.5hr, low = 112.4hr; p = 0.44). Median TTB was significantly longer during high AB (high = 8.0hr, low = 5.9hr; p = 0.0004). There was no difference in RTED visits (high = 12.4%, low = 10.6%; p = 0.15) or 30-day mortality (high = 8.4%, low = 9.2%; p = 0.51). **Conclusion**: In conclusion, consultation time is not affected by AB. However, boarding admitted patients in the ED impairs our ability to meet funding-associated performance metrics. Reducing boarding time should be an ED and hospital-wide priority, as it negatively impacts funding and delays patient care.
Keywords: access block, consultation, crowding

LO81

Interrater agreement and time it takes to assign a Canadian Triage and Acuity Scale score pre and post implementation of eCTAS

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Introduction: In addition to its clinical utility, the Canadian Triage and Acuity Scale (CTAS) has become an administrative metric used by governments to estimate patient care requirements, emergency department (ED) funding and workload models. The electronic Canadian Triage and Acuity Scale (eCTAS) initiative aims to improve patient safety and quality of care by establishing an electronic triage decision support tool that standardizes that application of national triage guidelines across Ontario. The objective of this study was to evaluate triage times and score agreement in ED settings where eCTAS has been implemented. **Methods**: This was a prospective, observational study conducted in 7 hospital EDs, selected to represent a mix of triage processes (electronic vs. manual), documentation practices (electronic vs. paper), hospital types (rural, community and teaching) and patient volumes (annual ED census ranged from 38,000 to 136,000). An expert CTAS auditor observed on-duty triage nurses in the ED and assigned independent CTAS in real time. Research assistants not involved in the triage process independently recorded triage time. Interrater agreement was estimated using unweighted and quadratic-weighted kappa statistics with 95% confidence intervals (CIs). **Results**: 1491 (752 pre-eCTAS, 739 post-implementation) individual patient CTAS assessments were audited over 42 (21 pre-eCTAS, 21 post-implementation) seven-hour triage shifts. Exact modal agreement was achieved for 567 (75.4%) patients pre-eCTAS, compared to 685 (92.7%) patients triaged with eCTAS. Using the auditor's CTAS score as the reference standard, eCTAS significantly reduced the number of patients over-triaged (12.0% vs. 5.1%; Δ 6.9, 95% CI: 4.0, 9.7) and under-triaged (12.6% vs. 2.2%; Δ 10.4, 95% CI: 7.9, 13.2). Interrater agreement was higher with eCTAS (unweighted kappa 0.89 vs 0.63; quadratic-weighted kappa 0.91 vs. 0.71). Research assistants captured triage time for 3808 patients pre-eCTAS and 3489 post implementation of eCTAS. Median triage time was 312 seconds pre-eCTAS and 347 seconds with eCTAS (Δ 35 seconds, 95% CI: 29, 40 seconds). **Conclusion**: A standardized, electronic approach to performing CTAS assessments improves both clinical decision making and administrative data accuracy without substantially increasing triage time.
Keywords: electronic Canadian Triage and Acuity Scale (eCTAS), interrater agreement, triage

LO82

Does triage assignment correlate with outcome for ed patients presenting with chest pain?

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Introduction: CTAS triage acuity and CEDIS complaint categories are used to prioritize patients for rapid treatment and ED resource allocation. Our objective was to evaluate CTAS and CEDIS validity for risk stratification of ED patients with chest pain using data from two Canadian cities. **Methods**: This administrative database study included patients seen over a five-year period with a triage complaint of chest pain. Our composite primary outcome included 7-day mortality, cardiac arrest, acute coronary syndrome (ACS) diagnosis (STEMI, NSTEMI, unstable angina{UA}), admission to a critical care unit, or hospitalization with CHF, pulmonary embolism, dysrhythmia, aortic pathology, neurologic or respiratory diagnosis. We dichotomized triage assignments to cardiac vs. noncardiac chest pain and high (CTAS 1,2) vs. low (3,4,5) triage acuity. For our secondary outcome we reported the components of the primary composite outcome. **Results**: We studied 111,824 patients. The most common overall diagnoses were chest pain NYD (53.8%), ACS (8.9%), musculoskeletal (7.4%), and acute respiratory (5.5%) or GI (5.1%) conditions. Of all patients studied, 85,888 (76.8%) were placed in the "cardiac features" group, and 93,257 (83.4%) fell into high acuity CTAS 1-2. Patients triaged into the "cardiac features" group were more likely to have a composite outcome event (16.6% v. 6.7%; p < 0.001), to be admitted (21.8% v. 9.0%), to require critical care (6.0% v. 0.7%), to receive an ACS diagnosis (11.3% v. 0.9%), and to die within 7 days (0.5% v. 0.2%). Patients in high acuity triage levels were also more likely to have a composite outcome event (15.8% v. 3.3%; p < 0.001), to be admitted (25.4% v. 14.3%), to require critical care (8.2% v. 1.2%), to receive an ACS diagnosis (10.5% v. 0.9%), and to die within 7 days (0.5% v. 0.2%). **Conclusion**: This study shows that triage assignment is strongly correlated with important patient outcomes and that both the chief complaint and acuity level are powerful risk predictors. These findings may differ at other sites and hospitals should assess and evaluate their data.
Keywords: chest pain, outcomes, triage

LO83

Quick Refresher Sessions (QRS): improving chest compression training for medical students

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Innovation Concept: High-quality cardiopulmonary resuscitation saves lives; however, current certification standards can leave providers poorly prepared to perform effective chest compressions (CCs). We designed a training program based on the emerging model of skill maintenance through frequent short practice sessions. The ideal frequency of training is currently unknown. Our goal was to provide medical students with access to efficient and effective CC training and to determine an optimal training interval. **Methods**: Thirty-six second-year medical students were randomized to three groups that trained at different frequencies: once every two months (q2m) (n = 12), once every four months (q4m) (n = 13), and control (n = 11). Study duration was eight months with the intervention groups, q2m and q4m, participating in five and three sessions respectively. The control group was assessed at study start and end, receiving no training in

between. At each session, participants completed a one-minute pre-test of CC performance, viewed a one-minute training video, practiced CCs for two minutes with real-time feedback, and completed a one-minute post-test. Performance parameters measured were CC depth, rate, release, and hand positioning. A final "compression score" assessed integrated performance across these parameters and served as our primary outcome. Participants also reported pre- and post-training comfort with performing CCs which served as our secondary outcome. **Curriculum, Tool or Material**: Our "Quick Refresher Sessions" (QRS) were completed by participants independently without requiring an assessor or facilitator. A manikin with the ability to record and provide real-time quantitative feedback on CC quality was connected to a laptop running a customized interface. Participants typed in an individualized code and were guided through their six-minute sessions automatically. **Conclusion**: Immediately following the first training session, subjects had significant improvement in compression score ($p < 0.001$) and skill comfort ($p < 0.001$). At eight months, both intervention groups, q2m and q4m, achieved higher compression scores than control ($p = 0.001$ and $p = 0.011$) and showed greater increase in comfort level ($p = 0.002$ and $p = 0.010$). Performance between intervention groups at eight months was not statistically different. Overall, we conclude that independent QRS training every two or four months led to improved CC quality and provider comfort. Future directions include increasing sample size and tailoring training intervals to individual performance.

Keywords: automated real-time feedback, innovations in EM education, resuscitation medicine

LO84

Ready to run the show: development of a new instrument for assessing resident competence in the emergency department

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Innovation Concept: The outcome of emergency medicine training is to produce physicians who can competently run an emergency department (ED) shift. While many workplace-based ED assessments focus on discrete tasks of the discipline, others emphasize assessment of performance across the entire shift. However, the quality of assessments is generally poor and these tools often lack validity evidence. The use of entrustment scale anchors may help to address these psychometric issues. The aim of this study was to develop and gather validity evidence for a novel tool to assess a resident's ability to independently run an ED shift. **Methods**: Through a nominal group technique, local and national stakeholders identified dimensions of performance reflective of a competent ED physician. These dimensions were included in a new tool that was piloted in the Department of Emergency Medicine at the University of Ottawa during a 4-month period. Psychometric characteristics of the items were calculated, and a generalizability analysis used to determine the reliability of scores. An ANOVA was conducted to determine whether scores increased as a function of training level (junior = PGY1-2, intermediate = PGY3, senior = PGY4-5), and varied by ED treatment area. Safety for independent practice was analyzed with a dichotomous score. **Curriculum, Tool or Material**: The developed Ottawa Emergency Department Shift Observation Tool (O-EDShOT) includes 12-items rated on a 5-point entrustment scale with a global assessment item and 2 short-answer questions. Eight hundred and thirty-three assessment were completed by 78 physicians for 45 residents. Mean scores differed significantly by training level ($p < .001$) with junior residents receiving lower ratings (3.48 ± 0.69) than intermediate residents who received lower ratings (3.98 ± 0.48) than senior residents (4.54 ± 0.42). Scores did not vary by ED treatment area ($p > .05$). Residents judged to be safe to independently run the shift had significantly higher mean scores than those judged not to be safe (4.74 ± 0.31 vs 3.75 ± 0.66; $p < .001$). Fourteen observations per resident, the typical number recorded during a 1-month rotation, were required to achieve a reliability of 0.80. **Conclusion**: The O-EDShOT successfully discriminated between junior, intermediate and senior-level residents regardless of ED treatment area. Multiple sources of evidence support the O-EDShOT producing valid scores for assessing a resident's ability to independently run an ED shift.

Keywords: entrustment, innovations in EM education, workplace-based assessment

LO85

Development of a competency based assessment tool for emergency department point of care ultrasound

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Innovation Concept: Assessment of residents' Point of Care Ultrasound (PoCUS) competency currently relies on heterogenous and unvalidated methods, such as the completion of a number of proctored studies. Although number of performed studies may be associated with ability, it is not necessarily a surrogate for competence. Our goal was to create a single Ultrasound Competency Assessment Tool (UCAT) using domain-anchored entrustment scoring. **Methods**: The UCAT was developed as an anchored global assessment score, building on a previously validated simulation-based assessment tool. It was designed to measure performance across the domains of Preparation, Image Acquisition, Image Optimization, and Clinical Integration, in addition to providing a final entrustment score (i.e., OSCORE). A modified Delphi method was used to establish national expert consensus on anchors for each domain. Three surveys were distributed to the CAEP Ultrasound Committee between July-November 2018. The first survey asked members to appraise and modify a list of anchor options created by the authors. Next, collated responses from the first survey were redistributed for a re-appraisal. Finally, anchors obtaining >65% approval from the second survey were condensed and redistributed for final consensus. **Curriculum, Tool or Material**: Twenty-two, 26, and 22 members responded to the surveys, respectively. Each anchor achieved >90% final agreement. The final anchors for the domains were: Preparation – positioning, initial settings, ensures clean transducer, probe selection, appropriate clinical indication; Image Acquisition – appropriate measurements, hand position, identifies landmarks, visualization of target, efficiency of probe motion, troubleshoots technical limitations; Image Optimization – centers area of interest, overall image quality, troubleshoots patient obstacles, optimizes settings; Clinical Integration – appropriate interpretation, understands limitations, utilizes information appropriately, performs multiple scans if needed, communicates findings, considers false positive and negative causes of findings. **Conclusion**: The UCAT is a novel assessment tool that has the potential to play a central role in the training and evaluation of residents. Our use of a modified Delphi method, involving key stakeholders in PoCUS education, ensures that the UCAT has a high degree of process and content validity. An important next step

in determining its construct validity is to evaluate the use of the UCAT in a multi-centered examination setting.
Keywords: assessment, innovations in EM education, ultrasound

LO86

Improving time to analgesia administration for musculoskeletal injuries in the emergency department.

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Background: Greater than 80% of patient visits to emergency departments (EDs) are for a pain-related concerns. Approximately 38,000 patients per year have such complaints in our academic hospital ED. 3,300 (8.6%) of those visits are for musculoskeletal (MSK) pain (i.e. back or extremity injury/pain), which are typically triaged as low-acuity presentations, leading to longer times to clinician assessment. Delays to adequate analgesia result in unnecessary suffering, worse patient care and satisfaction, and increased patient complaints. **Aim Statement:** We aimed to reduce the time-to-analgesia (TTA; time from patient triage to receipt of analgesia) for patients with MSK pain in our ED by 55% (to under 60 minutes) in 9 months' time (May 2018). **Measures & Design**: Our outcome measures were TTA (in minutes) and ED length of stay (LOS; in minutes). Process measures included nurses' use of medical directive and rate of analgesia administration. Balancing measures included patient adverse events and time spent triaging for nurses. We utilized weekly data capture for the Statistical Process Control (SPC) chart, and we used Mann-Whitney U test for our before-and-after evaluation. Utilizing the Model for Improvement, we performed wide stakeholder engagement and root cause analyses, and we created a Pareto chart. This led to our Plan-Do-Study-Act (PDSA) cycles: 1) nurse-initiated analgesia (NIA) at triage; 2) new triage documentation aid for medication administration; 3) quick reference medical directive badge tag for nurses; 4) weekly targeted feedback of the project's progress at clinical team huddle. **Evaluation/Results:** TTA decrease from 129 minutes ($n = 153$) to 100 minutes (22.5%; $n = 87$, $p < 0.05$). ED LOS decreased from 580 minutes ($n = 361$) to 519 minutes (10.5%; $n = 187$; $p = 0.77$). Special cause variation was identified on the ED LOS SPC chart with eight consecutive points below the midline, after PDSA 1. The number of patients who received any analgesia increased from 42% ($n = 361$) to 47% ($n = 187$; $p = 0.13$). The number of patients who received medications via medical directives increased from 22% ($n = 150$) to 44% ($n = 87$; $p < 0.001$). Balancing measures were unchanged. **Discussion/Impact:** The significant reduction in the TTA and increase in the use of medical directives in the before-and-after analyses were likely due to our front-line focused improvements and deliberate nursing engagement. With continued success and sustainable processes, we are planning to spread our project to other EDs and broaden our initiative to all pain-related concerns.
Keywords: analgesia, pain management, quality improvement and patient safety

LO87

Impact of an evidence-based clinical pathway for suspected renal colic in low-risk patients with previous nephrolithiasis on CT utilization and emergency department throughput

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Background: Choosing Wisely (CW) recommends patients under age 50 with uncomplicated, recurrent renal colic do not require CT scans. Despite this, CT use has risen dramatically in the past two decades, resulting in unnecessary radiation, cost and prolonged length of stay (LOS). Additionally, a common alternative – formal ultrasound (US) – is not always available. Returning for US can add 10 hours to LOS. We introduced a clinical management pathway (CMP) for low-risk patients with renal colic utilizing point-of-care ultrasound (POCUS) and evaluated its impact on emergency department (ED) CT rates and LOS. **Aim Statement:** By April 2019, we aim to reduce CT utilization by 50% and time from physician initial assessment (PIA) to discharge by 1 hour for patients under age 50 presenting to Sunnybrook ED with uncomplicated, recurrent renal colic. **Measures & Design**: The primary intervention was a CMP developed collaboratively with local urologists. The CMP uses POCUS to assess for hydronephrosis (HN) as a marker of nephrolithiasis. Patients with HN receive follow-up in urology clinic without confirmatory imaging. Patients without HN proceed to usual care. An Ishikawa diagram helped identify barriers to success. Subsequent PDSA cycles included the introduction of reference cards, POCUS workshops and online modules. Outcome measures were ED CT utilization and PIA to discharge times. Process measures were referrals to urology clinic and proportion of patients receiving XR, US and no imaging. Balancing measures were urology CT utilization, alternate diagnoses and return ED visits. Data was plotted on a run chart. **Evaluation/Results:** Data collection is ongoing and will conclude by April 2019. Interim data shows patients enrolled in the CMP have a reduction in mean PIA-to-discharge time of 173 minutes. Fidelity – specifically, the willingness of ED physicians to use POCUS compared to the ease of ordering CTs – is the biggest challenge to success. **Discussion/Impact:** This study addresses the feasibility of CW recommendations and utilizes POCUS as a tool for recurrent renal colic. Collaboration with Urology will provide insight into the CMP's sustainability and downstream impact. Reduction of unnecessary CTs will lead to improved patient safety and reduced costs. Decreased PIA-to-discharge times will reduce overcrowding, shorten wait times and improve access to imaging for other patients. Finally, this project may encourage use of POCUS for low-risk patients with renal colic.
Keywords: point-of-care ultrasound, quality improvement and patient safety, renal colic

LO88

Reducing urine culture testing in the emergency department

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Background: The Choosing Wisely campaign aims to reduce unnecessary testing. Over testing for urinary tract infections and concomitant overtreatment of asymptomatic bacteriuria is a target of this campaign, aiming to decrease healthcare costs and the risks of side effects such as Clostridium difficile infection, adverse reactions, and antimicrobial resistance. During the study baseline (2017), 95 urine cultures (UC) were sent for every 1000 ED visits (9.5%). Of these, fewer than 20% were positive. **Aim Statement:** The aim of this improvement initiative was to reduce UC testing in the ED, by 50%, from a baseline average of nearly 100 cultures per 1000 ED patients visits, to 50 cultures per 1000 visits, by May 31st, 2018. **Measures & Design**: This was an interrupted time series study, analyzed using Statistical Process Control (SPC) methodology. Root

cause analysis was performed using an Ishikawa diagram. A Pareto chart was completed via multi-voting. A Driver Diagram was developed using the highest ranked items from the Pareto chart to identify locally relevant and feasible interventions. Interventions 1) Medical directives were modified; Routine paired sending of UC with urinalysis by nurses was removed. 2) Physician Education and implementation of a clinical decision aid (CDA); A CDA was created using PDSA methodology, using an iterative approach from development through implementation. Outcome measure: rate of Urine Cultures sent per 1000 ED patient visits Process measure: percent of positive cultures Balancing measures: rate of 14-day ED return visits and hospital admission for patients diagnosed with UTI/Urosepsis/Pyelonephritis. **Evalution/Results:** At the study's conclusion, there was a decrease in UC rate, from 95 per 1000 ED visits, to 59 per 1000 ED visits (RR 38%, AR 3.6%) There was evidence of special cause variation on the SPC chart. Positive cultures increased from 19% to 34%. There was no increase in the rate of ED 14-day return visits or hospital admission for patients with a diagnosis of UTI, urosepsis or pyelonephritis. **Discussion/Impact:** The study interventions of uncoupling routine sending of UA and UC, and physician education and use of a clinical decision aid, effectively decreased the rate of UC testing during the study period. A reduction in inappropriate UC testing is important to limit avoidable patient morbidity and reduce unnecessary health care spending. Further studies are indicated to target interventions on patient subgroups and to reduce unnecessary antibiotic prescriptions.

Keywords: Choosing Wisely, quality improvement and patient safety, urinary tract infections

LO89

A multi-disciplinary quality improvement project to improve adherence to best practice guidelines for emergency department patients with transient ischemic attack

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Background: Canadian Stroke Guidelines recommend that Transient Ischemic Attack (TIA) patients at highest risk of stroke recurrence should undergo immediate vascular imaging. Computed tomography angiography (CTA) of the head and neck is recommended over carotid doppler because it allows for enhanced visualization of the intracranial and posterior circulation vasculature. Imaging while patients are in the emergency department (ED) is optimal for high-risk patients because the risk of stroke recurrence is highest in the first 48 hours. **Aim Statement:** At our hospital, a designated stroke centre, less than 5% of TIA patients meet national recommendations by undergoing CTA in the ED. We sought to increase the rate of CTA in high risk ED TIA patients from less than 5% to at least 80% in 10 months. **Measures & Design**: We used a multi-faceted approach to improve our adherence to guidelines including: 1) education for staff ED physicians; 2) agreements between ED and radiology to facilitate rapid access to CTA; 3) agreements between ED and neurology for consultations regarding patients with abnormal CTA; and 4) the creation of an electronic decision support tool to guide ED physicians as to which patients require CTA. We measured the rate of CTA in high risk patients biweekly using retrospective chart review of patients referred to the TIA clinic from the ED on a biweekly basis. As a balancing measure, we also measured the rate of CTA in non-high risk patients. **Evaluation/Results:** Data collection is ongoing. An interim run chart at 19 weeks shows a complete shift above the median after implementation, with CTA rates between 70 and 100%. At the time of submission, we had no downward trends below 80%, showing sustained improvement. The CTA rate in non-high risk patients did also increase. **Disucssion/Impact:** After 19 weeks of our intervention, 112 (78.9%) of high risk TIA patients had a CTA, compared to 10 (9.8%) in the 19 weeks prior to our intervention. On average, 10-15% of high risk patients will have an identifiable lesion on CTA, leading to immediate change in management (at minimum, an inpatient consultation with neurology). Our multi-faceted approach could be replicated in any ED with the engagement and availability of the same multi-disciplinary team (ED, radiology, and neurology), access to CTA, and electronic orders.

Keywords: neuroimaging, quality improvement and patient safety, transient ischemic attack

LO90

The clock is ticking: using in situ simulation to improve time to blood delivery in bleeding trauma patients

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Background: Massive transfusion protocols (MTP) are widely used to rapidly deliver blood products to bleeding trauma patients. Every minute delay in blood product administration in bleeding trauma patients is associated with a 5% increased odds of death. In-situ simulation (ISS) is simulation that takes place in the actual clinical work environment. We used ISS as a novel, prospective and iterative quality improvement (QI) approach to identify and improve MTP steps that impact time to blood delivery (TTBD) during actual trauma resuscitations. **Aim Statement:** To reduce the TTBD for bleeding trauma patients by 20% over a 12-month ISS-based QI initiative. **Measures & Design**: We conducted twelve high-fidelity, interprofessional ISS sessions at a Level-1 trauma center in Toronto, Canada. We used clinician video review as well as extensive stakeholder involvement, including with nurses, porters, blood bank and human factors experts, to develop Plan-Do-Study-Act (PDSA) cycles for MTP improvement. Our three major PDSA cycles revolved around: 1) decreasing MTP activation time; 2) reducing the unpredictable and inefficient transport times for the blood itself; and 3) improving the notification of blood product arrival in the trauma bay. Each PDSA cycle was iteratively tested with ISS prior to implementation into clinical care. Outcome measure was the mean TTBD for trauma patients requiring MTP (in minutes, standard deviation [SD]). Process measures included time to MTP activation and porter transport times. Balancing measures included stakeholder satisfaction. **Evaluation/Results:** Our baseline TTBD for MTP patients was 11.58min ($n = 41$, SD 6.8). There were 54 trauma patients that had MTP during the ISS-based QI initiative, and their mean TTBD was 10.44min (SD 6.1). The TTBD after the QI initiative was 9.12min, sustained over 1 year ($n = 50$, SD 5.3; 21.2% relative reduction, $p < 0.05$). A run chart did not show special cause variation chronologically related to our interventions. Patients in each group were similar in demographic data, trauma characteristics and injury severity score. **Discussion/Impact:** We achieved a 21.2% reduction in TTBD for trauma patients requiring MTP with an ISS-based QI initiative. ISS represents a novel approach to the identification and iterative testing of process improvements within trauma care. This methodology can and

should be included in QI projects in order to safely test and improve processes of care before they impact real patients.
Keywords: in situ simulation, mass transfusion protocol, quality improvement and patient safety

LO91

Urinary tract infections in the paediatric emergency department: A quality improvement initiative to promote diagnostic and antimicrobial stewardship

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Background: Urinary tract infection (UTI) is a common diagnosis in children presenting to the Emergency Department (ED) and often leads to empiric antibiotic treatment prior to culture results. A recent study at our centre found that 47% of children diagnosed with a UTI and discharged on antibiotics had a negative urine culture. None of these patients were notified of the negative result or to discontinue antimicrobial treatment. **Aim Statement:** The aim of this study was to improve UTI diagnostic accuracy by 50% while promoting antimicrobial stewardship through timely antibiotic discontinuation and standardized antimicrobial treatment for uncomplicated UTIs over the next 12 months. **Measures & Design**: Three interventions were developed using plan-do-study-act (PDSA) cycles. In collaboration with the hospital's Choosing Wisely campaign and antimicrobial stewardship program, an evidence-based empiric UTI diagnostic algorithm was created to aid with diagnostic decision-making and reduce practice variation. A daily call-back system was also implemented for urine cultures where patients who had a negative urine culture were contacted to stop antibiotics. Lastly, a practice alert was integrated in the EMR as a reminder of appropriate antimicrobial prescription duration. The main outcome measures were the percentage of inappropriately diagnosed UTIs and percentage with timely antimicrobial discontinuation. Process measures included antibiotic days saved, treatment duration, and physician adherence to the algorithm. As a balancing measure, positive urine cultures were reviewed to assess accuracy of the algorithm to detect UTIs and potential harm from delayed UTI diagnoses. **Evaluation/Results:** Early results from the 530 children included in the analysis demonstrated a 14% reduction in inappropriate UTI diagnoses. With the initiation of the call-back system, the antibiotic days saved increased from 0 to 495 days. Call-backs for negative cultures increased from 0% to 68% of the time. Of those positive cultures with a missed UTI diagnosis, only 5 patients in 5 months had a return visit within 72 hours and none required admission. **Discussion/Impact:** Appropriate diagnosis and treatment of UTIs in our ED has improved with the implementation of a diagnostic algorithm. A larger impact is anticipated once the algorithm is embedded in the EMR as a form of decision support, but these changes take time to implement. Although labour intensive, the call-back system has greatly impacted the antimicrobial days saved and reduced risk for harm in this population.
Keywords: antimicrobial stewardship, emergency medicine, quality improvement and patient safety

LO92

Improving patient communication in an emergency department's rapid assessment zone

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Background: Emergency Department (ED) communication between patients and clinicians is fraught with challenges. A local survey of 65 ED patients revealed low patient satisfaction with ED communication and resultant patient anxiety. **Aim Statement:** To increase patient satisfaction with ED communication and to decrease patient anxiety related to lack of ED visit information (primary aims), and to decrease clinician-perceived patient interruptions (secondary aim), each by one point on a 5-point Likert scale over a six-month period. **Measures & Design**: We performed wide stakeholder engagement, surveyed patients and clinicians, and conducted a patient focus group. An inductive analysis followed by a yield-feasibility-effort grid led to three interventions, introduced through sequential and additive Plan-Do-Study-Act (PDSA) cycles. PDSA 1: clinician communication tool (Acknowledge-Empathize-Inform [AEI] tool), based on survey themes and a literature review, and introduced through a multi-modal education approach. PDSA 2: patient information pamphlets developed with stakeholder input. PDSA 3: new waiting room TV screen with various informational ED-specific videos. Measures were conducted through anonymous surveys: Primary aims towards the end of the patient ED stay, and the secondary aim at the end of the clinician shift. We used Statistical Process Control (SPC) charts with usual special cause variation rules. Two-tailed Mann-Whitney tests were used to assess for statistical significance between means (significance: $p < 0.05$). **Evaluation/Results:** Over five months, 232 patient and 104 clinician surveys were collected. Wait times, ED processes, timing of typical steps, and directions were reported as the most important communication gaps, they and were included in the interventions. Patient satisfaction improved from 3.28 (5 being best, all means; $n = 65$) to 4.15 ($n = 59$, $p < 0.0001$). Patient anxiety improved from 2.96 (1 being best; $n = 65$) to 2.31 ($n = 59$, $p < 0.01$). Clinician-perceived interruptions went from 4.33 (1 being best; $n = 30$) to 4.18 ($n = 11$, $p = 0.98$). SPC charts using Likert scales did not show special cause variation. **Discussion/Impact:** A sequential, additive approach undertaken with pragmatic and low-cost interventions based on both clinician and patient input led to increased patient satisfaction with communication and decreased patient anxiety due to lack of ED visit information after PDSA cycles. These approaches could easily be replicated in other EDs to improve the patient experience.
Keywords: communication, emergency department, quality improvement and patient safety

LO93

Implementation of sepsis order sets to decrease the time to antibiotics in the emergency department: a quality improvement initiative

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Background: Sepsis is a life-threatening syndrome, and delays to appropriate antibiotic therapy increases mortality. Order sets have shown decrease in time to antibiotics in pneumonia, and in sepsis, the implementation of order sets resulted in more intravenous fluids, appropriate initial antibiotics and lower mortality. **Aim Statement:** The goal was to create an order set for an approach to septic patients, to improve sepsis management. We sought to improve time from triage to first antibiotics, by 15 minutes, for Emergency Department (ED) patients with sepsis in three months after implementation compared to three months before. **Measures & Design**: We used a literature review, as well as comparison to existing order sets at other EDs to design our initial order set. We underwent multiple revisions based on

stakeholder feedback. We educated physician and nursing teams about the order sets, although use was ultimately at physician discretion. We implemented the order set on April 9, 2017. After three months, an electronic retrospective chart review identified patients with a final sepsis diagnosis admitted to the critical care unit. For each patient, we captured triage time using the electronic record, and time to antibiotics from when the antibiotic was taken out of the medication cart. Finally, utilization of order sets was checked via manual chart audit. **Evaluation/Results:** A run chart did not demonstrate any shifts or trends suggesting a change after implementation. Median time to antibiotics in minutes, 3 months prior (n = 45) and post (n = 55) intervention, increased from 245 to 340 minutes, although the range was very large. Chart audits demonstrated clinicians were not using the order sets. There was 10% usage for 2 of the months and 0% usage the other month, post-intervention. **Disucssion/Impact:** There was insufficient uptake of the Sepsis Order Set by the Sunnybrook ED to result in any impact on time to antibiotics. Order sets require more than just implementation to be effective. Difficulties in implementation were due to the document not being readily available to physicians. To mediate, we have organized nursing staff to attach the order set onto charts based on triage assessment and will re-assess with another PDSA cycle after this intervention.
Keywords: order sets, quality improvement and patient safety, sepsis

Moderated Poster Presentations

MP01

Retention and treatment outcomes for patients with substance use disorders treated in a rapid access to addiction medicine clinic

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Introduction: Substance use is prevalent in Canada yet treatment for alcohol use disorder (AUD) and opioid use disorder (OUD) is often inaccessible. Consequently, alcohol and opioid-related diagnoses such as intoxication, withdrawal, and overdose are a major reason for frequent emergency department (ED) visits. The Rapid Access to Addiction Medicine (RAAM) Clinic opened at the University Health Network (UHN) in January 2018 as part of a larger network of clinics in Toronto, and provides rapid, low barrier access to medical treatment for substance use disorder (SUD). Patients attended via self-referral, peer-referral, or referral by the ED, primary care, internal medicine or withdrawal management services. This study describes the demographic profile and short-term outcomes for patients attending a new RAAM clinic in its first 26 weeks of operation, including substance use and treatment retention for AUD and OUD. **Methods**: We reviewed the electronic medical record at the clinic over its first 26 weeks of operation. We assessed SUD diagnoses, referral source, prescribed medications, self-reported outcomes and retention rates. We calculated descriptive statistics using proportions for categorical variables and means with standard error for continuous variables. A student's t-test was used for all statistical analyses using Microsoft Excel. We reviewed the electronic medical record at the clinic over its first 26 weeks of operation. We assessed SUD diagnoses, referral source, prescribed medications, self-reported outcomes and retention rates. We calculated descriptive statistics using proportions for categorical variables and means with standard error for continuous variables. A student's t-test was used for all statistical analyses using Microsoft Excel. **Results**: The clinic saw 64 unique patients: 66% had an AUD, 39% had an OUD and 20% had a stimulant use disorder. 55% of patients were referred from outpatient care providers, 30% from the emergency department and 11% from withdrawal management services. 42% remained ongoing patients, 23% were discharged to other care and 34% were lost to follow-up. Gabapentin (38%), naltrexone (33%), and acamprosate (20%) were most frequently prescribed for AUD. Patients with AUD reported a significant decrease ($p < 0.05$) in alcohol consumption at their most recent visit compared to their initial visit. Most patients (78%) with OUD were prescribed buprenorphine, and most (89%) patients with OUD on buprenorphine had a negative urine screen at their most recent visit. **Conclusion**: A new RAAM outpatient clinic demonstrates the early success of a low-barrier addictions model in addressing unmet needs in substance use treatment. We see a reduction in both alcohol consumption and opioid use, and increased access to evidence-based pharmacotherapy for SUDs.
Keywords: addiction, low-barrier, outpatient

MP02

Diagnostic, medical, and surgical interventions that reduce emergency hospital admissions: a systematic review of systematic reviews of 215 randomized controlled trials

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Introduction: Emergency hospital admissions are a growing concern for patients and health systems, globally. The objective of this study was to systematically review the evidence for diagnostic, medical, and surgical interventions that reduce emergency hospital admissions. **Methods**: We conducted a systematic review of systematic reviews by searching MEDLINE, PubMED, the Cochrane Database of Systematic Reviews, Google Scholar, and grey literature. Systematic reviews of any diagnostic, surgical, or medical interventions examining the effect on emergency hospital admissions among adults were included. The quality of reviews was assessed using AMSTAR and the quality of evidence was assessed using GRADE. The subsequent analysis was restricted to interventions with moderate or high-quality evidence only. **Results**: 13 051 titles and abstracts and 1 791 full-text articles were screened from which 42 systematic reviews were included. The reviews included an underlying evidence base of 215 randomized controlled trials with 135 282 patients. Of 20 unique diagnostic, medical, and surgical interventions identified, four had moderate (n = 4) or high (n = 0) quality evidence for significant reductions in hospital admissions in five patient populations. These were: cardiac resynchronization therapy for heart failure and atrial fibrillation, percutaneous aspiration for pneumothorax, early/routine coronary angiography for acute coronary syndrome (alone or comorbid with chronic kidney disease), and natriuretic peptide guided therapy for heart failure. **Conclusion**: We identified four interventions across five populations that when optimized, may lead to reductions in emergency hospital admissions. These finding can therefore help guide the development of quality indicators, standards, or practice guidelines.
Keywords: emergency hospital admissions, systematic review

MP03

Strategies to minimize impact of electronic health record implementation on emergency department flow

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Introduction: Electronic health record (EHR) implementation can be associated with a slowdown in performance and delayed return to pre go-live productivity. The objective of this study is to describe the impact of a go-live strategy including diversion, public advertising of the go-live, and extra physician staffing to mitigate productivity loss. **Methods**: Lions Gate Hospital (LGH), an urban community hospital and rural referral centre with 250 beds and 65,000 annual ED visits went live with Cerner HER (Cerner Corporation, Kansas, MO) on April 28, 2018. The implementation included complete electronic ordering and electronic physician documentation. We compared patients seen per hour, time to physician (TTMD), ED length of stay (EDLOS), patients per hour left without being seen (LWBS), and admission rate (AR) for the 6 weeks prior to implementation (Pre), 2 weeks during (Imp), and 6 weeks after (Post) for LGH and a control hospital (Richmond Hospital – comparable in size/acuity) for the same periods. Medians were compared using the Mann-Whitney test for patients/hour, EDLOS and TTMD, and chi-square for AR and LWBS. **Results**: Patients/hour seen went from 2.1/hour in the pre phase, but dropped to 1.7/hr in the 2 week period following implementation ($P < 0.05$). During weeks 2-8 post implementation, 2,3 patients per hour were seen ($P = 0.38$ compared to Pre phase). At the control hospital, patients per hour were comparable across all time periods (Ps > 0.3). Median time to physician was 54, 56, and 54 minutes at LGH for the Pre, Imp, and Post time periods (Ps > 0.3). Median EDLOS was 184, 196, and 184 minutes in the pre, Imp, and post phases (P Imp versus pre = 0.11; Pre versus post = 0.54). LWBS rate was 1.3%, 2.9, and 2.4% (Ps for Imp and Post versus pre <0.05) at LGH, but the pattern was similar for the control hospital (2.9%, 4.1% and 4.0%' Ps <0.05). There was no significant change in ambulance arrivals or admission rate at either hospital (Ps > 0.2). **Conclusion**: A deliberate implementation strategy that focuses on ED physician upstaffing and visit diversion can smooth the impact of the implementation of an EHR so that patient care is not impacted significantly. Return to normal productivity occurred by 8 weeks post go-live. We demonstrate a strategy that may support easier implementation at other sites.

Keywords: physician productivity, electronic health record, patient volumes

MP04

rEDirect: safety and compliance of an emergency department diversion protocol for mental health and addictions patients

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Introduction: Transportation of patients better served at an alternative destinations (diversion) is part of a proposed solution to emergency department (ED) overcrowding. We evaluated the pilot implementation of the "Mental Health and Addiction Triage and Transport Protocol". This is the first Canadian diversion protocol that allows paramedics to transport intoxicated or mental health patients to an alternative facility, bypassing the ED. Our aim was to implement a safe diversion protocol to allow patients to access more appropriate service without transportation to the emergency department. **Methods**: A retrospective analysis was conducted on patients presenting to EMS with intoxication or psychiatric issues. Study outcomes were protocol compliance, determined through missed protocol opportunities, noncompliance, and protocol failure (presentation to ED within 48 hours of appropriate diversion); and protocol safety, determined through patient morbidity (hospital admission within 48 hours of diversion) and mortality. Data was abstracted from EMS reports, hospital records, and discharge forms from alternative facilities. Data was analyzed qualitatively and quantitatively. **Results**: From June 1st, 2015 to May 31st, 2016 Greater Sudbury Paramedic Services responded to 1376 calls for mental health or intoxicated patients. 241 (17.5%) met diversion criteria, 158 (12.9%) patients were diverted and 83 (4.6%) met diversion criteria but were transported to the ED. Of the diverted patients 9 (5.6%) represented to the ED <48rs later and were admitted. Of the 158 diversions, 113 (72%) were transported to Withdrawal Management Services (WMS) and 45 (28%) were taken to Crisis Intervention (CI). There was protocol noncompliance in 77 cases, 69 (89.6%) were due to incomplete recording of vital signs; 6 (10.3%) were direct protocol violations of being transferred with vital sings outside the acceptable range. **Conclusion**: The Mental Health and Addiction Triage and Transport Protocol has the potential to safely divert 1 in 6 mental health or addiction patients to an alternative facility.

Keywords: emergency medical service, mental health, quality improvement and patient safety

MP05

Diagnostic accuracy of point of care ultrasound in undifferentiated hypotension presenting to the emergency department: a systematic review

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Introduction: Undifferentiated hypotension remains one of the most life-threatening presentations to emergency departments (ED) around the world. An accurate and rapid initial assessment is essential, as shock carries a high mortality with multiple unique etiologies and management plans. Point of care ultrasound (PoCUS) has emerged as a promising tool to improve these diagnostic and management challenges, yet its reliability in this setting remains unclear. **Methods**: We performed a systematic review of Medline, EMBASE, CINAHL, Cochrane, and clinicaltrials.gov databases from inception to June 8, 2018. Databases were reviewed by two independent researchers and all languages were included. The methodological quality of included studies were evaluated using the Quality Assessment of Diagnostic Accuracy Studies (QUADAS-2) tool. Our primary outcome was diagnostic accuracy of PoCUS in hypotension, with secondary outcomes including patient outcomes and changes to management. **Results**: Our literature search revealed 5345 articles after duplicates were removed, leaving 235 articles for full article review. Following full article review, 9 studies remained and were included in the systematic review. There were 2 randomized control trials, 6 prospective cohort trials, and 1 retrospective cohort trial. For our primary outcome of diagnostic accuracy, eight studies were included; we extracted Kappa values ranging from 0.70 to 0.971, pooled sensitivity ranging from 69% to 88%, and pooled specificity ranging from 88% to 96%. Four studies reported on management change including results reporting shorter time to disposition, change in diagnostic test ordering (18% to 31%), change in consultation (13.6%), change in admission location (12%) and change in management plan (25% to 40%). Only one study reported on patient outcomes, which revealed no survival or length of stay benefit. **Conclusion**: When assessing for the diagnostic accuracy of PoCUS in the setting of undifferentiated hypotension presenting to the emergency department, we found fair consistency between PoCUS and final diagnosis with high Kappa values, fair to good pooled sensitivities, and good to excellent specificities.

There was no strong evidence indicating improved outcomes. However, the large amount of heterogeneity amongst studies has limited our ability to make a strong conclusion except that future research should focus on a uniform study design and patient focused outcomes.
Keywords: hypotension, point of care ultrasound, shock

MP06

Impact of anticoagulation on mortality and resource utilization among critically ill patients with major bleeding in the emergency department

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Introduction: Patients with major bleeding (e.g. gastrointestinal bleeding, and intracranial hemorrhage [ICH]) are commonly encountered in the Emergency Department (ED). A growing number of patients are on either oral or parenteral anticoagulation (AC), but the impact of AC on outcomes of patients with major bleeding is unknown. With regards to oral anticoagulation (OAC), we particularly sought to analyze differences between patients on Warfarin or Direct Oral Anticoagulants (DOACs). **Methods**: We analyzed a prospectively collected registry (2011-2016) of patients who presented to the ED with major bleeding at two academic hospitals. "Major bleeding" was defined by the International Society on Thrombosis and Haemostasis criteria. The primary outcome, in-hospital mortality, was analyzed using a multivariable logistic regression model. Secondary outcomes included discharge to long-term care among survivors, total hospital length of stay (LOS) among survivors, and total hospital costs. **Results**: 1,477 patients with major bleeding were included. AC use was found among 215 total patients (14.6%). Among OAC patients (n = 181), 141 (77.9%) had used Warfarin, and 40 (22.1%) had used a DOAC. 484 patients (32.8%) died in-hospital. AC use was associated with higher in-hospital mortality (adjusted odds ratio [OR]: 1.50 [1.17-1.93]). Among survivors to discharge, AC use was associated with higher discharge to long-term care (adjusted OR: 1.73 [1.18-2.57]), prolonged median LOS (19 days vs. 16 days, P = 0.03), and higher mean costs ($69,273 vs. $58,156, P = 0.02). With regards to OAC, a higher proportion of ICH was seen among patients on Warfarin (39.0% vs. 32.5%), as compared to DOACs. No difference in mortality was seen between DOACs and Warfarin (adjusted OR: 0.84 [0.40-1.72]). Patients with major bleeding on Warfarin had longer median LOS (11 days vs. 6 days, P = 0.03) and higher total costs ($51,524 vs. $35,176, P < 0.01) than patients on DOACs. **Conclusion**: AC use was associated with higher mortality among ED patients with major bleeding. Among survivors, AC use was associated with increased LOS, costs, and discharge to long-term care. Among OAC patients, no difference in mortality was found. Warfarin was associated with prolonged LOS and costs, likely secondary to higher incidence of ICH, as compared to DOACs.
Keywords: anticoagulation, critical care, hemorrhage

MP07

Diagnosis of elevated intracranial pressure in critically ill adults – a systematic review and meta-analysis

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Introduction: Elevated intracranial pressure (ICP) is a devastating complication of brain injury, such as traumatic brain injury, subarachnoid hemorrhage, intracerebral hemorrhage, ischemic stroke, and other conditions. Delay to diagnosis and treatment are associated with increased morbidity and mortality. For Emergency Department (ED) physicians, invasive ICP measurement is typically not available. We sought to summarize and compare the accuracy of physical examination, imaging, and ultrasonography of the optic nerve sheath diameter (ONSD) for diagnosis of elevated ICP. **Methods**: We searched Medline, EMBASE and 4 other databases from inception through August 2018. We included only English studies (randomized controlled trials, cohort and case-control studies). Gold standard was ICP≥20 mmHg on invasive ICP monitoring. Two reviewers independently screened studies and extracted data. We assessed risk of bias using Quality Assessment of Diagnostic Accuracy Studies 2 criteria. Hierarchical Summary Receiver Operating Characteristic model generated summary diagnostic accuracy estimates. **Results**: We included 37 studies (n = 4,768, kappa = 0.96). Of exam signs, pooled sensitivity and specificity for increased ICP were: mydriasis (28.2% [95% CI: 16.0-44.8], 85.9.0% [95% CI: 74.9-92.5]), motor posturing (54.3% [95% CI: 36.6-71.0], 63.6% [95% CI: 46.5-77.8]) and Glasgow Coma Scale (GCS) ≤8 (75.8% [95% CI: 62.4-85.5], 39.9% [95% CI: 26.9-54.5]). Computed tomography findings: compression of basal cisterns had 85.9% [95% CI: 58.0-96.4] sensitivity and 61.0% [95% CI: 29.1-85.6] specificity; any midline shift had 80.9% [95% CI: 64.3-90.9] sensitivity and 42.7% [95% CI: 24.0-63.7] specificity; midline shift≥1cm had 20.7% [95% CI: 13.0-31.3] sensitivity and 89.2% {95% CI: 77.5-95.2] specificity. Finally, pooled area under the ROC curve describing accuracy for ONSD sonography for ICP was 0.94 (95% CI: 0.91-0.96). **Conclusion**: The absence of any one physical exam feature (e.g. mydriasis, posturing, or decreased GCS) is not sufficient to rule-out elevated ICP. Significant midline shift is highly suggestive of elevated ICP, but absence of shift does not rule it out. ONSD sonography may be useful in diagnosing elevated ICP. High suspicion of elevated ICP may necessitate treatment and transfer to a centre capable of invasive ICP monitoring.
Keywords: intracranial hemorrhage, intracranial pressure, traumatic brain injury

MP08

The frequency of emergency departments visits for patients with end-of-life conditions: a call for action

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Introduction: An increasing number of patients with end-stage diseases present to emergency departments (EDs) for physical, spiritual, psychological and social care. The objective of this study was to identify patients with end-stage diseases with palliative care (PC) needs and document their frequency of ED visits. **Methods**: This prospective cohort study was conducted in two Canadian EDs. Using a

modified palliative care screening tool, volunteer ED physicians were asked to identify adult patients with end-stage, chronic conditions including cancer, chronic obstructive pulmonary disease (COPD), chronic kidney disease (CKD), heart failure (HF), cirrhosis, dementia and/or progressive central nervous system (PCNS) disease. Demographic data were collected from these tools and data regarding patients' visits in both the 6 months prior to and 30 days following their index visits were collected from the ED Information System. Bivariate analyses were completed using Student's t and chi-square test. **Results**: A total of 663 patients with end-stage illness were identified; 338 (51%) were female and the median age was 76 (IQR: 63, 85). Cancer was the most common presentation (41%), followed by dementia (23%), COPD (16%), HF (9%), CKD (9%), PCNS disease (9%) and cirrhosis (7%). These patients made a total of 1277 visits in the 6 months prior to and 288 in the 30 days following the index visit. Patients presenting to the EDs with cancer ($p = 0.001$), cirrhosis ($p = 0.005$) and CKD ($p = 0.03$) were more likely to visit an ED in the 6 months prior to their index visit. In contrast, patients presenting with dementia ($p < 0.0001$) and PCNS disease ($p = 0.02$) were significantly less likely to present to an ED in the 6 months prior to their index visit. Patients presenting with cirrhosis or CKD had the highest average number of ED visits in the 6 months prior to their index visit (cirrhosis: 4.59 visits, SD: 3.8, $p < 0.0001$; CKD: 4.39 visits, SD: 3.8, $p = 0.0001$). Of these patients, those presenting with end-stage cirrhosis were significantly more likely to make a return visit to an ED within 30 days after their index visit ($p = 0.014$). **Conclusion**: Cancer is the most common condition for patients with end-stage, chronic illnesses in these EDs. Those presenting with cirrhosis or CKD are at a significantly higher risk of repeat visits to the EDs. This study has identified potential deficits in care and can serve as a baseline for future intervention studies.

Keywords: emergency department, palliative care

MP09

Critical care skills training day for emergency medicine residents: A curriculum in evolution

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Introduction: Emergency medicine (EM) residents are expected become proficient in a number of rarely performed, high risk procedures. We developed Critical Care Skills Training Day for senior FRCP and CCFP EM residents at a single university program to fill a gap in resident confidence with these procedures. The day applies principles of deliberate practice with focused feedback using simulation-based training for several rarely performed procedures including thoracotomy, fibre-optic intubation, pericardiocentesis, resuscitative hysterotomy and central line insertion. The objectives of this work was to improve the residents' scores of self-perceived comfort independently performing these procedures by completion of the training day. **Methods**: Clinician educators, residency program directors and simulation specialists designed and taught the curriculum. We used pre- and post-training day surveys blending Likert, multiple choice and free text comments to measure comfort performing each procedure, overall satisfaction and usefulness of this training. Descriptive statistics were used to analyze results. Pre-post differences were assessed using paired sample T-tests. Comments and themes from course evaluations were used to make yearly iterative changes. **Results**: A total of 95 residents completed the curriculum between 2016-2018. 89 completed evaluations (93%). Residents reported significant ($p < 0.05$) improvement in comfort independently performing fibre optic intubation, thoracotomy and central line insertion. The day was rated very highly, 9.4/10 (SD, 0.72), over 3 years. Feedback was positive with participants identifying opportunities for repeated practice, feedback from instructors and practical tips to improve performance as valuable aspects. Iterative changes were made yearly in response to resident feedback including introduction of new procedures, incorporating skills into sim-based cases, and different training models for skill training. **Conclusion**: Critical Care Skills Training Day for EM residents was created using the principle of deliberate practice to fill a perceived gap in resident training. Residents who completed the annual curriculum showed a marked increase in comfort independently performing several of the procedures. Ongoing challenges include the length of the day, economies of scale, and training models available for the rare procedures. Future directions include the integration of longitudinal objective performance evaluations to align with the competency by design curriculum.

Keywords: deliberate practice, procedural skills, simulation

MP10

Does early intervention improve outcomes for patients with acute ureteral colic?

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Introduction: The optimal initial management approach for ureteral colic is unclear. Guidelines recommend spontaneous passage for most patients, but early stone intervention may rapidly terminate acute episodes. We compared 60-day treatment failure rates in matched patients undergoing early intervention versus spontaneous passage. **Methods**: We used administrative data and structured chart review to study all emergency department (ED) patients at nine Canadian hospitals who had an index ureteral colic visit and a computed tomography (CT) confirmed 2.0-9.9 mm stone during 2014. Using Cox Proportional Hazards models, we assessed 60-day treatment failure, defined as hospitalization or rescue intervention, in patients undergoing early intervention compared to propensity-score matched controls undergoing trial of spontaneous passage. **Results**: From 3,081 eligible patients, mean age 51 years and 70% male, we matched 577 patients in each group (total 1154). Control and intervention cohorts were balanced on all parameters and propensity scores, which reflect the conditional probability a patient would undergo early intervention, were similarly distributed. In the time to event analysis, 21.8% in both groups experienced the composite primary outcome of treatment failure (difference = 0%; 95% CI, -4.8 to 4.8%). Early intervention patients required more ED revisits (36.1% v. 25.5%; difference 10.6%; 95% CI 5.3 to 15.9%) and more 60-day hospitalizations (20.1% v. 12.8%). The strongest predictors of adverse outcome were stone size, proximal or middle stone location, and ED length of stay. **Conclusion**: If applied broadly to patients with 2.0-9.9mm ureteral stones, an early interventional approach was associated with similar rates of treatment failure, but more hospitalizations and emergency revisits. Research clarifying subgroups most likely to benefit will facilitate better targeting of early intervention, potentially reducing patient morbidity and improving system utilization.

Keywords: intervention, outcomes, renal colic

MP11

Evaluation of a pharmacist-led antimicrobial stewardship service in a pediatric emergency department

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Introduction: We implemented a pharmacist-led antimicrobial stewardship (AMS) service for patients discharged from the pediatric emergency department (PED). This service, supported by a collaborative practice agreement, allows pharmacists to follow up with patients and independently stop, start, or adjust antimicrobial agents based on culture results. The primary objective of our study was to evaluate the impact of this service on the rate of return visits to the PED within 96 hours. The secondary objective was to evaluate the appropriateness of the prescribed antimicrobial agent at follow up. **Methods**: This study was completed as a retrospective chart review 6 months pre-implementation (January 1st, 2016 to June 31st, 2016) and 6 months post-implementation (February 1st, 2017 to July 31st, 2017) of a pharmacist-led AMS service. A research assistant extracted data from electronic medical records using a standardized data collection form. All patients discharged from the PED with a suspected infection whose cultures fell within the parameters of the collaborative practice agreement were included in this study. Data were reported descriptively and compared using a two-sided chi-square test. **Results**: This study included 1070 patient encounters pre-implementation and 1040 patient encounters post-implementation of the AMS service. The most commonly reviewed culture was urine (38% pre-implementation and 41% post-implementation). The rate of return visits to the PED within 96 hours was 12.0% (129/1070) pre-implementation vs 10.0% (100/1049) post-implementation phase ($p = 0.07$). A significantly higher percentage of inappropriate antimicrobial therapy was identified at the time of follow up in the pre-implementation phase (7.0%, 68/975) compared to the post-implementation phase (5.0%, 46/952), $p = 0.047$. **Conclusion**: Although this pharmacist-led AMS service did not affect the rate of return visits within 96 hours, it may have led to more judicious use of antimicrobial agents.

Keywords: antimicrobial stewardship, pediatric emergency department

MP12

Preparing emergency patients and providers study: patient expectations and factors leading to presentation

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Introduction: Effective communication to develop a shared understanding of patient expectations is critical to a positive encounter in the Emergency Department (ED). However, there is limited research examining Patient/Caregiver (P/C) expectations in the ED and what factors lead to P/C presentation. This study aims to address this gap by answering the following questions: 1) What are common P/C reported factors affecting ED presentation? 2) What are common P/C expectations of an ED visit? 3) How do P/C expectations vary based on ED site or factors affecting presentation in the ED? **Methods**: The Preparing Emergency Patients and Providers (PrEPP) tool was designed to collect P/C expectations, worries, perceived causes of symptoms, and factors affecting presentation from a convenience sample of patient visits to the emergency department (ED). The PrEPP tool was provided to all P/Cs with CTAS 2-5 when they registered at one of 4 EDs in the Halifax area from January to June 2016. Completed tools were collected in a REDCap database where qualitative data was coded into categories (i.e. presenting illness, injury). Descriptive and chi-squared statistical analyses were performed. **Results**: In total, 11,418 PrEPP tools were collected; representing 12% of the total ED visits to the 4 ED sites during the study period. The main factors affecting ED presentation were: self-referral 68%, family/friends 20%, telehealth 8%, unable to see their GP 7%, GP referral 6%, or walk-in-clinic 5%. P/Cs main causes of worry were: presenting illness 19%, injury 15%, or pain 14%. The main expectations for the ED visit were to get a: physician's opinion 73%, x-ray 40%, or blood test 20%. Most P/Cs indicated they did not expect medication during (63%), or after (66%), their ED visit. There were significant differences in P/C expectations between adult and pediatric EDs ($\chi2 = 720.949$, $df = 14$, $P = 0.000$) and those P/Cs unable or able to access primary care prior to ED presentation ($\chi2 = 38.980$, $df = 1$, $P = 0.000$). The rate of expecting a physician's opinion at the pediatric ED was higher than the adult ED (77.6% vs 70.9%), while lower for expecting CT/MRIs (4.6% vs 11.4%). P/Cs who were unable to access primary care prior to ED presentation expected services which were available at primary care at a higher rate than those who accessed primary care (58.5% vs 36.7%). **Conclusion**: Our findings identify some of the factors that influence P/C's decision to present to the ED and their expectations of the ED visit.

Keywords: communication, emergency department, patient expectations

MP13

Association between the quantity of subcutaneous fat and the inter-device agreement of two tissue oximeters

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Introduction: Near-infrared spectroscopy (NIRS) can be used to monitor the oxygen saturation of hemoglobin in any given superficial tissue. However, the measurements provided by different oximeters can vary a lot. Little is known about the specific patient characteristics that could affect the inter-device agreement of tissular oximeters. This study aimed to evaluate the association between the quantity of subcutaneous fat (assessed by skinfold thickness) and the inter-device agreement of two tissue oximeters, the INVOS 5100c and the Equanox 7600. **Methods**: In this prospective cohort study, tissue saturations and skinfold thickness were measured at four different sites on both sides of the body in healthy adult (≥18 years old) volunteers. The association between the quantity of subcutaneous fat (assessed by skinfold thickness) and the inter-device agreement (absolute difference between the oximetry values provided by the two oximeters) was first assessed with a Pearson's correlation and a scatter plot. Subsequently, a linear mixed model was used to evaluate the impact of the subcutaneous fat and other covariables (age, sex) on the inter-device agreement while adjusting for the repeated measurements across different sites for the same volunteers. **Results**: From January to March 2015, 53 healthy volunteers were included in this study with ages ranging between 20 and 81 years old, on which a total of 848 measures were taken. Higher skinfold measures were associated with an increase in the difference between measures provided by both oximeters (Slope = -0.59, Pearson correlation coefficient

= -0.51, p < 0.001). This observed association persisted in a linear mixed model (-0.48 [95% confidence interval {CI}-0.61 to -0.36], p < 0.001). The sex of the volunteers also influenced the inter-oximeter agreement (Women:-5.77 [95%CI -8.43 to -3.11], p < 0.001), as well as the forearm sites (Left forearm: −7.16 [95%CI -9.85 to –4.47], p < 0.001; right forearm: −7.01 [95%CI -9.61 to −4.40], p < 0.001). **Conclusion**: The quantity of subcutaneous fat, as well as the sex of the volunteers and the measurement sites, impacted the inter-device agreement of two commonly used oximeters. Given these findings, monitoring using tissue oximetry should be interpreted with great care when there is a significant quantity of subcutaneous fat.
Keywords: inter-device agreement, near-infrared spectroscopy, tissular oximetry

MP14

Use of conventional cardiac troponin assay for diagnosis of non-ST-elevation myocardial infarction: 'The Ottawa Troponin Pathway'

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Introduction: Guidelines recommend serial conventional cardiac troponin (cTn) measurements 6-9 hours apart for non-ST-elevation myocardial infarction (NSTEMI) diagnosis. We sought to develop a pathway based on absolute/relative changes between two serial conventional cardiac troponin I (cTnI) values 3-hours apart for 15-day MACE identification. **Methods**: This was a prospective cohort study conducted in the two large ED's at the Ottawa Hospital. Adults with NSTEMI symptoms were enrolled over 32 months. Patients with STEMI, hospitalized for unstable angina, or with only one cTnI were excluded. We collected baseline characteristics, Siemens Vista cTnI at 0 and 3-hours after ED presentation, disposition, and ED length of stay (LOS). Adjudicated primary outcome was 15-day MACE (AMI, revascularization, or death due to cardiac ischemia/unknown cause). We analysed cTnI values by 99th percentile cut-off multiples (45, 100 and 250ng/L). **Results**: 1,683 patients (mean age 64.7 years; 55.3% female; median ED LOS 7 hours; 88 patients with 15-day MACE) were included. 1,346 (80.0%) patients with both cTnI ≤45ng/L; and 58 (3.4%) of the 213 patients with one value≥100ng/L but both <250ng/L or ≤20% change did not suffer MACE. Among 124 patients (7.4%) with one value >45ng/L but both <100ng/L based on 3 or 6-hour cTnI, one patient with Δ<10ng/L and 6 of 19 patients with Δ≥20ng/L were diagnosed with NSTEMI (patients with Δ10-19ng/L between first and second cTnI had third one at 6-hours). Based on the results, we developed the Ottawa Troponin Pathway (OTP) with a 98.9% sensitivity (95%CI 96.7-100%) and 94.6% specificity (95%CI 93.4-95.7%). **Conclusion**: The OTP, using two conventional cTnI measurements performed 3-hours apart, should lead to better identification of NSTEMI particularly those with values >99th percentile cut-off, standardize management and reduce the ED LOS.
Keywords: chest pain, non-ST elevated myocardial infarction (NSTEMI), troponin

MP15

Blood transfusion in upper gastrointestinal bleeding: evaluating physician practices in the emergency department

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Introduction: Acute upper gastrointestinal bleeding (UGIB) is a common presentation to emergency departments (ED). Of these patients, 35-45% receive a blood transfusion. Guidelines for blood transfusion in UGIB have been well established, and recommend a hemoglobin (Hb) level below 70 g/L as the transfusion target in a stable patient. There is no consensus on a transfusion threshold for unstable UGIB. There is limited data regarding physician practices in the ED. The aim of our study is to determine the appropriateness, by expert consensus, of blood transfusions in UGIB in a tertiary care hospital ED. **Methods**: We retrospectively reviewed patients presenting with UGIB to the University of Alberta Hospital ED in 2016. These patients were then screened for blood transfusions. Data were obtained from the patient records. Chart derived data were verified with records obtained from the blood bank. For each patient, the history, vitals, Glasgow Blatchford Score (GBS), relevant labs, and record of blood transfusions were collected and organized into a case summary. Each patient summary was presented individually to a panel of three expert clinicians (2 Gastroenterology, 1 Emergency Medicine), who then decided on the appropriateness of each blood transfusion by consensus. **Results**: Blood transfusions (data available 395/400) were given to 51% (202/395) of patients presenting with UGIB. Of these, 86% (174/202) were judged to be appropriate. Of the 395 patients, 34% (135/395) had a Hb of <70 g/L. Of these, 93% (126/135) were transfused, and all of these were considered appropriate. 18% (70/395) had a Hb between 71-80. 74% (52/70) of these patients were given blood, and 79% (41/52) were considered appropriate. 13% (50/395) of the patients had a Hb between 81-90, with 28% (14/50) receiving a transfusion. Of these, 36% (5/14) were deemed to be appropriate. 35% (140/395) of patients had a Hb of >90. 7% (10/140) of these received blood. 20% (2/10) were considered appropriate. **Conclusion**: The panel of expert clinicians judged 86% of the blood transfusions to be appropriate. All transfusions under the recommended guideline of 70 g/L were considered appropriate. In addition, the majority of transfusions above a Hb of 70 g/L were considered appropriate, but 37% were not. Further studies evaluating the feasibility of current guideline recommendations in an ED setting are required. Educational interventions should be created to reduce inappropriate blood transfusions above a Hb 70 g/L.
Keywords: blood transfusion, upper gastrointestinal bleeding

MP16

Which PoCUS skills are retained over time for medical students?

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Introduction: Point-of-care ultrasonography (PoCUS) is being incorporated into Canadian undergraduate medical school curricula. The purpose of this study was to evaluate novel PoCUS education sessions to determine what aspects of the sessions benefitted from hands-on training and which PoCUS skills were retained over time. **Methods**: Second year medical students voluntarily received three different PoCUS training sessions, each lasting three hours. Prior to the sessions, participants prepared independently with pre-circulated online learning materials. After a 15-minute lecture, experienced PoCUS providers led small group (1 instructor: 5 students), live

scanning sessions. Evaluations were conducted before and after each session using expert validated multiple choice questions testing general and procedural knowledge, image recognition and interpretation. Volunteer students were evaluated via direct observation of live scanning using an objective structured assessment of technical skills (OSAT) based on the O-score and then re-evaluated at 2 months post-training to assess PoCUS skills retention. **Results**: 40 second year medical students participated in extended Focused Assessment with Sonography for Trauma (eFAST), cardiac, and gallbladder PoCUS sessions. The live-training sessions significantly improved student PoCUS knowledge beyond what they learned independently for eFAST ($p < 0.001$), cardiac ($p < 0.001$), and gallbladder ($p = 0.02$). The largest improvement was noted in procedural knowledge test scores improving from 44.0% to 84.0% ($n = 38$). 16 students were evaluated after each session with a mean O-score of 2.37. 8 students returned two months later to be re-evaluated demonstrating a change in O-scores for eFAST (2.00 to 2.38, $p = 0.15$), cardiac (2.28 to 2.00, $p = 0.32$), and gallbladder (2.91 to 1.88, $p < 0.001$). **Conclusion**: Procedural PoCUS knowledge benefited the most with hands-on training. eFAST and cardiac PoCUS competency was maintained over time while gallbladder PoCUS competency degraded suggesting that targeted PoCUS skills training may be possible. Further study is required to determine the best use of PoCUS resources in undergraduate medical education.

Keywords: competency based assessment, innovations in EM education, point of care ultrasonography

MP17

Education innovation: A tool to teach consultation skills using rapid cycle deliberate practice

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Innovation Concept: Consultation skills (the collaborator role) are key for safe and effective Emergency Medicine practice. The tool described uses educational techniques familiar to Emergency Physicians and residents (rapid cycle deliberate practice and focused debriefing) to incorporate teaching of this skill into on-shift clinical teaching of Emergency Medicine residents. **Methods**: We searched the literature for consultation teaching methods. We developed a tool to teach consultation as part of on-shift clinical teaching using pedagogical concepts familiar to Emergency Medicine residents, rapid cycle deliberate practice and focused debriefing. The developed tool has three phases; 1) Introduction to a framework for good consultation skills, 2) Managing push-back and understanding competing frames of reference and 3) Direct observation and feedback on the actual consultation. The tool is designed to be used during a clinical shift. Over a series of consecutive cycles the resident refines a consultation and is eventually directly observed during the actual interaction with a consultant. **Curriculum, Tool or Material**: For each of the three phases the tool provides a framework for the preceptor to use to guide the presentation and discussion. During phases 1 and 2 the resident will present the consultation a number of times and the preceptor will provide focused debriefing allowing the presentation to be refined and optimized. During phase 3 the preceptor provides direct observation of the actual consultation followed by focused debriefing. Phase 1: Focuses on understanding the learners current skill level and presents a framework for a high quality consultation. Phase 2: Introduces the concept of competing frames of reference and push-back and patient centred strategies for managing this situation. Phase 3: The actual consultation interaction between resident and consultant is observed and debriefed. **Conclusion**: Consultation skills are important in the day to day practice of Emergency Medicine but rarely the subject of specific teaching. The tool presented can be used during clinical shifts to teach consultation skills using pedagogy familiar to both Emergency Physicians adEM residents.

Keywords: consultation skills, deliberate practice, innovations in EM education

MP18

Addressing unrealistic expectations: a novel transition to discipline curriculum in emergency medicine

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Innovation Concept: Emergency medicine (EM) programs have restructured their training using a Competence by Design model. This model emphasizes entrustable professional activities (EPAs) that residents must fulfill before advancing in their training. The first EPA (EPA 1) for the transition to discipline (TTD) stage involves managing the unstable patient. Data from the University of Toronto (U of T) program suggests residents lack enough exposure to these patient presentations during TTD – creating a disconnect between anticipated clinical exposure and the expectation for residents to achieve competence in EPA 1. **Methods**: To overcome this gap, U of T EM faculty specifically targeted EPA 1 while designing the TTD curriculum. Kern's six-step approach to curriculum development in medical education was used. This six-step approach involves: problem identification, needs assessment, goals and objectives, education strategies, implementation and evaluation. To maximize feasibility of the new curriculum, existing sessions were mapped against EPAs and required training activities to identify synchrony where possible. Residents were scheduled on EM rotations with weekly academic days that included this novel curriculum. **Curriculum, Tool or Material**: Didactic lectures, procedural workshops and simulation were closely integrated in TTD to address EPA 1. Lectures introduced approaches to cardinal presentations. An interactive workshop introduced ACLS and PALS algorithms and defibrillator use. Three simulation sessions focused on ACLS, shock, airway, trauma and the altered patient. A final simulation session allowed spaced-repetition and integration of these topics. After the completion of TTD, residents participated in a six-scenario simulation OSCE directly assessing EPA 1. **Conclusion**: The curriculum was evaluated using a multifaceted approach including surveys, self-assessments, faculty feedback and OSCE performance. Overall, the curriculum achieved its goal in addressing EPA 1. It was well-received by faculty and residents. Residents rated the sessions highly, and self-reported improved confidence in assessing unstable patients and adhering to ACLS algorithms. The simulation OSCE demonstrated expected competency by residents in EPA 1. One limitation identified was the lack of a pediatric simulation session which has now been incorporated into the curriculum. Moving forward, this innovative curriculum will undergo continuous cycles of evaluation and improvement with a goal of applying a similar design to other stages of CBD.

Keywords: Competence by Design, innovations in EM education, simulation

MP19

Creation and implementation of an educational emergency medicine clinical handbook

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Innovation Concept: Medical students often face challenges when entering clerkship. The abundance of teaching tools and online resources make it difficult for learners to navigate and apply knowledge in a clinical setting. Although valuable study aids exist across Emergency Medicine (EM) clerkship curriculums, a convenient resource tailored to junior learners for on-shift use is lacking. We created an academic resource with the intent of assessing student engagement with the handbook. **Methods**: Ottawa's Clerkship Guide to Emergency Medicine was developed using information from a commonly used EM textbook and relevant literature. After a comprehensive peer-review by staff EM physicians, the resource was published online and made available to learners in March 2018. To assess utility of this resource, a national survey was administered followed by a Likert-type analysis. Website metrics and the survey results were used to guide a sustainable model for annual student-driven resource updates. **Curriculum, Tool or Material**: The handbook contains high-yield EM topics organized into one-page summaries. The main sections include resuscitation, symptoms-based approach, and medical emergencies. Students can access the handbook online, via mobile app, or use a printable version. Over 7300 unique downloads have occurred since launch. Our national survey revealed that of the total respondents (N = 171, 93.6% 3rd-year clerks, 31.6% uOttawa students), 97.1% (n = 166) had used the handbook on shift. A majority were able to find an answer to their clinical question either fully (53%, n = 88) or partially (46.4%, n = 77) and many would recommend this resource as-is (62.7%, n = 104) or with some modifications (34.3%, n = 57). Compared to the student's preferred clinical resource, mean Likert-type scores showed a significant ($p < 0.01$) positive difference in favor of the handbook regarding themes of organization (3.83 vs. 4.38), length (3.43 vs. 4.76) and ease in accessibility (3.46 vs. 4.79). **Conclusion**: The value of this handbook for junior learners entering their acute care rotation is evident. We demonstrated that student uptake of this handbook was robust. Compared to commonly used resources, students felt this handbook was more organized, concise in length, and easy to integrate into their clinical workflow. Implementation of this handbook across Canadian EM curriculums may bridge the EM knowledge gap in junior learners and off-service residents.

Keywords: clinical handbook, innovations in EM education, study guide

MP20

Resuscitative thoracotomy: development of a video curriculum to teach a rare procedure

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Innovation Concept: Resuscitative thoracotomy (RT) is a life-saving procedure in select trauma patients. However, RT is infrequently performed, limiting trainee exposure. In a survey of American training programs, graduating residents had performed an average of 3 RTs. There is no published data regarding the number of RTs observed and performed by Canadian trainees. We theorized that RT procedural exposure and comfort level would be low in emergency medicine (EM) trainees at our institution due to lack of exposure. Thus, we aimed to create a first person procedural video using local resources to teach RT. **Methods**: We first created a needs assessment survey conducted within Western University Division of Emergency Medicine over two months in 2018. Senior residents observed an average of 1.5 RT procedures and participated in an average of 0.6. Furthermore, 88% of senior residents cited a lack of confidence in their ability to perform this procedure and 87% indicated an instructional video would be a valuable educational tool. We created a video described in detail below. Prior to video distribution a survey was distributed asking respondents to list the critical steps in performing an RT. Participants were then asked to view the video and complete the survey again. Responses were scored by two independent reviewers. **Curriculum, Tool or Material**: An immersive cadaveric simulation video was developed in collaboration with a trauma surgeon at our institution. The video reviewed our thoracotomy tray, RT indications/contraindications, and demonstrated a narrated first-person RT on a floppy embalmed cadaver. Potential difficulties encountered during the procedure are highlighted throughout the video with troubleshooting tips suggested. **Conclusion**: We had 46 survey respondents from our division (25 residents and 21 consultants). After viewing the video, procedural step scores were significantly higher for junior FRCPC ($p = 0.001$), senior FRCPC ($p = 0.013$), and CCFP-EM ($p < 0.001$) residents as well as consultants ($p = 0.016$). There was also an increase in the number of respondents who reported confidence in their ability to perform RT post-video (n = 4 pre-video; n = 11 post-video). This video is an inexpensive, effective way to teach the critical procedural steps of RT and can be easily adapted for use at other institutions. Next steps for further education in this topic include development of a hands-on cadaveric simulation curriculum for residents.

Keywords: innovations in EM education, resuscitative thoracotomy, trauma education

MP21

A brief educational session is effective for teaching emergency medicine residents resuscitative transesophageal echocardiography

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Innovation Concet: Resuscitative clinician-performed transesophageal echocardiography (TEE) is a relatively new ultrasound application that has the potential to guide the management of critically ill patients in the emergency department. The objective of this study was to determine the effectiveness of a brief training workshop for teaching a resuscitative TEE protocol to emergency medicine residents using a high-fidelity simulator. **Methods**: Emergency medicine residents with no prior TEE experience that were rotating through a university-affiliated emergency department were invited to participate in the study. Participants completed a questionnaire and baseline skill assessment using a high-fidelity simulator. The training session included a 20 minute lecture followed by 10 simulated repetitions of a 5-view TEE sequence with instructor feedback. Learning was evaluated by a skill assessment immediately after training and a transfer test 1-2 weeks after the training session. Ultrasound images and transducer motion metrics were captured by the simulator for blinded analysis. The primary outcome of this study was the percentage of successful views before and after training as determined by two blinded reviewers using an anchored scoring tool. Secondary

outcomes included time to scan completion and diagnostic accuracy on the transfer test. Assessment scores were compared using a two-tailed t-test. **Curriculum, Tool or Material**: 22 of 25 (88%) of invited residents agreed to participate in the study. Percentage of successful views increased from 44.5% (SD 27.9) at baseline to 98.6% (SD 3.5) after training ($p < 0.001$), and was 86.8% (SD 12.1) on transfer testing ($p < 0.001$). Time to complete the scan was 330 seconds at baseline, 125 seconds after training ($p < 0.001$), and 184 seconds ($p < 0.001$) in the transfer test. Participants made the correct diagnosis in 75% (SD 25.6) of the cases in the simulated patient encounter. The descending aorta view had the highest success rate (93.2%) and the midesophageal long axis view had the lowest success rate (75.0%). **Conclusion**: A brief simulation-based workshop was effective for teaching emergency medicine residents a five-view resuscitative TEE protocol. Future studies are needed to determine optimal methods for long-term skill retention.

Keywords: innovations in EM education, simulation, transesophageal echocardiography

MP22

Guiding practice transition with a faculty mentorship program

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Innovation Concept: Transition to independent practice is challenging and early career physicians are more prone to burnout and error. Despite recommendations for formal mentorship to support physicians, only 43.6% of US academic Emergency Medicine departments have such programs. We describe an innovative mentorship program designed to support these early career physicians and enhance quality of care, career longevity, and wellness. We operationalized mentorship in which experienced, highly regarded, empathic mentors guide mentees in their personal and professional development. **Methods**: In this program two Emergency Physician mentors were teamed with each newly hired Emergency Physician. Mentees could request their own mentors, and teams were matched on the basis of shared personal and academic interests. Mentors received academic funding and training on good mentorship practice, roles and responsibilities, and feedback. Teams had to meet formally at least twice a year, with additional contact as needed. While mentees set the meeting agenda, teams were also encouraged to address four main areas. These areas were identified from a targeted needs assessment and literature review. They include: 1) clinical process and care, 2) departmental structure and culture, 3) teaching and scholarship, and 4) physician wellness. After meetings, mentees summarized and submitted the topics discussed and reflected on action plans. An oversight committee supported the program. **Curriculum, Tool or Material**: All nine (9) newly hired physicians joined the program in Fall 2018. As of December 2018, six (6) teams have had formal meetings. They discussed the following areas: clinical processes and care (50%), departmental structure and culture (100%), teaching and scholarship (67%), and physician wellness (100%). Other areas discussed include: academic career, financial planning, and networking. Teams spent 20-60% of the time formulating steps to achieve mentee career goals. They spent 40-60% of the time discussing skills and resources needed. End of year program evaluation will include outcomes such as satisfaction, value, effectiveness, projects, promotions, and awards. The results will shape future program design. **Conclusion**: We implemented a mentorship program for newly hired Emergency Physicians. As mentorship is integral to successful transition to independent practice, this program model could be highly beneficial to other academic Emergency Medicine departments.

Keywords: faculty development, innovation in EM education, mentorship

MP23

Giving medical students what they deserve - a rigorous, equitable and defensible CaRMS selection process

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Innovation Concept: The fairness of the Canadian Residency Matching Service (CaRMS) selection process has been called into question by rising rates of unmatched medical students and reports of bias and subjectivity. We outline how the University of Saskatchewan Royal College emergency medicine program evaluates CaRMS applications in a standardized, rigorous, equitable and defensible manner. **Methods**: Our CaRMS applicant evaluation methods were first utilized in the 2017 CaRMS cycle, based on published Best Practices, and have been refined yearly to ensure validity, standardization, defensibility, rigour, and to improve the speed and flow of data processing. To determine the reliability of the total application scores for each rater, single measures intraclass correlation coefficients (ICCs) were calculated using a random effects model in 2017 and 2018. **Curriculum, Tool or Material**: A secure, online spreadsheet was created that includes applicant names, reviewer assignments, data entry boxes, and formulas. Each file reviewer entered data in a dedicated sheet within the document. Each application was reviewed by two staff physicians and two to four residents. File reviewers used a standardized, criterion-based scoring rubric for each application component. The file score for each reviewer-applicant pair was converted into a z-score based on each reviewer's distribution of scores. Z-scores of all reviewers for a single applicant were then combined by weighted average, with the group of staff and group of residents each being weighted to represent half of the final file score. The ICC for the total raw scores improved from 0.38 (poor) in 2017 to 0.52 (moderate) in 2018. The data from each reviewer was amalgamated into a master sheet where applicants were sorted by final file score and heat-mapped to offer a visual aid regarding differences in ratings. **Conclusion**: Our innovation uses heat-mapped and formula-populated spreadsheets, scoring rubrics, and z-scores to normalize variation in scoring trends between reviewers. We believe this approach provides a rigorous, defensible, and reproducible process by which Canadian residency programs can appraise applicants and create a rank order list.

Keywords: applicant evaluation, Canadian residency matching service (CaRMS), innovations in EM education

MP24

The University of Ottawa's Department of Emergency Medicine pre-internship boot camp: a descriptive review

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Innovation Concept: Emergency Medicine (EM) residency programs in Canada have transitioned to competency based medical education and the first stage of the curriculum focuses on standardizing learner competency. Pre-internship boot camps provide a focused

opportunity to assist with this standardization prior to residency training. The objective of this descriptive review was to describe our institution's EM pre-internship boot camp in the context of current literature and to summarize the state of EM boot camp curricula across all reported EM residency programs. **Methods**: The description of our two-day boot camp included its curriculum design, required preparation and resources, and a detailed timeline of each day's events. To compare our boot camp to current literature, a comprehensive search of both primary and gray literature was performed. **Curriculum, Tool or Material**: Our institution's boot camp is two days of teaching focused on clinical knowledge and procedural competency, with a large component centered on simulation. Day one consisted of an introduction to the boot camp, a review of crisis resource management principles and advanced cardiac life support (ACLS) algorithms, ACLS simulation sessions, and small group skill sessions on common emergency department procedures. Day two contained a point of care ultra sound lecture, an ultrasound guided central venous catheterization session, pigtail and chest tube insertion sessions, and high-fidelity simulation cases. In comparison to the other pre-internship boot camps that were identified in the literature, our boot camp offers a unique focus and format. **Conclusion**: This review is the first to report on an EM-specific boot camp at a non-American institution, and it provides a framework for the development and refinement of pre-internship EM boot camps at other universities.
Keywords: boot camp, innovations in EM education, simulation

MP25

Implementation of pain order sets to decrease the time to analgesics in the emergency department: a quality improvement initiative in progress

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Background: Acute pain is a common presentation in the Emergency Department (ED) and inadequacy in its treatment can lengthen stay. Earlier analgesia use and discharge has been associated with positive patient experiences and improved pain management. Validated 'fast-track pathways' to aid physician decision making in analgesic administration is associated with decreased waiting times in renal colic diagnoses. **Aim Statement:** Our aim was to create an order set, for an approach to patients with acute pain, to reduce median time from point of triage to analgesia. We sought to reduce median time by 15 minutes, for ED patients with renal colic in the three months after implementation as compared to three months before. **Measures & Design**: We used a literature review and comparison to existing order sets at other EDs to design our draft. We focused our evaluation on patients with renal colic. We underwent multiple revisions based on stakeholder feedback and educated both physician and nursing teams about the order set. The utilization, however, was at physician discretion. We implemented the order set on March 30, 2017. After three months, an electronic retrospective chart review identified patients with a final renal colic diagnosis. For each patient, we captured triage time using electronic records and time to analgesia with the medication cart. Utilization of order sets was confirmed via manual chart audit. **Evaluation/Results:** A run chart showed worsening times after the intervention. Median time to analgesia in minutes, 3 months prior (n = 90) and post (n = 93) intervention, increased from 228 to 310 minutes, although the range was very large. Chart audits demonstrated a considerably low uptake of the order set with a small gradual increase from 0% to 20% over the 3-month period. **Discussion/Impact:** There was insufficient uptake of the Acute Pain order set preventing impact on time to analgesia. Changes in occupancy likely contributed to the worsening times. There was an increase in utilization over the 3-month period and could be due to increased awareness. This demonstrates that interventions require more than implementation to be effective. Difficulties in implementation were due to the document not being readily available. We have organized the nursing staff to attach order sets onto charts based on triage assessment and will re-assess with another PDSA cycle after this intervention.
Keywords: pain, quality improvement and patient safety, renal colic

MP26

Development and evaluation of a novel emergency physician fan-out mechanism at an urban centre for use in mass casualty incidents

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Background: Understaffing in mass casualty incidents limits flow in the overwhelmed emergency department, which is further compounded by inefficient use of those same human resources. Process mapping analysis of a "Code Orange" exercise at a tertiary academic hospital exposed the failures of telephone-based emergency physician fan-out protocols to address these issues. As such, a quality improvement and patient safety initiative was undertaken to design, implement, and evaluate a new mass casualty incident fan-out mechanism. **Aim Statement:** By February 2019, emergency physician fan-out will be accomplished within 1 hour of Code Orange declaration, with a response rate greater than 20%. **Measures & Design**: Process mapping of a Code Orange simulation highlighted telephone fan-out to be ineffective in mobilizing emergency physicians to provide care in mass casualty incidents: available staff were pulled from their usual duties to help unit clerks unsuccessfully reach off-duty physicians by telephone for hours. Stakeholders subsequently identified automation and computerization as a compelling change idea. A de-novo automated bidirectional text-messaging system was thus developed. Early trials were analyzed for process measures including fan-out speed, unit clerk involvement, and physician response rate, with further large-scale tests planned for early 2019. **Evaluation/Results:** Only 50% of telephone fan-out was completed after a 2-hour exercise despite 3 staff supplementing the 2 on-shift unit clerks, with a 4% physician response rate. In contrast, data from initial trials of the automated system suggest that full fan-out can be performed within 1 hour of Code Orange declaration and require only 1 unit clerk, with text-messages projected to yield higher physician response rates than telephone calls. Early findings have thus far affirmed stakeholder sentiments that automating fan-out can improve speed, unit clerk efficiency, and physician response rate. **Discussion/Impact:** Automated text-message systems can expedite fan-out protocol in mass casualty incidents, relieve allied health staff strain, and more reliably recruit emergency physicians. Large-scale trials of the novel system are therefore planned for early 2019, with future expansion of the protocol to other medical personnel under consideration. Thus, automated text-message systems can be implemented in urban centres to improve fan-out efficiency and aid overall emergency department flow in mass casualty incidents.
Keywords: disaster medicine, mass casualty incidents, quality improvement and patient safety

MP27

Designing team success - an engineering solution to avoid chest tube equipment chaos using best available evidence, consensus and prototyping

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Background: Chest tube insertion is a time and safety critical procedure with a significant complication rate (up to 30%). Industry routinely uses Lean and ergonomic methodology to improve systems. This process improvement study used best evidence review, small group consensus, process mapping and prototyping in order to design a lean and ergonomically mindful equipment solution. **Aim Statement:** By simplifying and reorganising chest tube equipment, we aim to provide users with adequate equipment, reduce equipment waste, and wasted effort locating equipment. **Measures & Design**: The study was conducted between March 2018 and November 2018. An initial list of process steps from the best available evidence was produced. This list was then augmented by multispecialty team consensus (3 Emergency Physicians, 1 Thoracic Surgeon, 1 medical student, 2 EM nurses). Necessary equipment was identified. Next, two prototyping phases were conducted using a task trainer and a realistic interprofessional team (1 EM Physician, 1 ER Nurse, 1 Medical student) to refine the equipment list and packaging. A final equipment storage system was produced and evaluated by an interprofessional team during cadaver training using a survey and Likert scales. **Evaluation/Results:** There were 47 equipment items in the pre-intervention ED chest tube tray. After prototyping 21 items were removed while nine critical items were added. The nine items missing from the original design were found in four different locations in the department. Six physicians and seven RNs participated in cadaver testing and completed an evaluation survey of the new layout. Participants preferred the new storage design (Likert median 5, IQR of 1) over the current storage design (median of 1, IQR of 1). **Discussion/Impact:** The results suggest that the lean equipment storage is preferred by ED staff compared to the current set-up, may reduce time finding missing equipment, and will reduce waste. Future simulation work will quantitatively understand compliance with safety critical steps, user stress, wasted user time and cost.

Keywords: chest tube, lean, quality improvement and patient safety

MP28

Reigniting improvements in emergency departments – New approaches to resolving unsolvable problems

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Background: In 2016 The Fraser Health Authority's Emergency Network established a priority to standardize patient access and flow through their 13 emergency departments (ED). A Model of Care (MOC) was developed after an extensive review of the literature and current practices across BC. **Aim Statement:** The ED Model of Care (MOC) specifies best practice expectations with respect to emergency patient access and flow. Rather than a 'top-down' mandate of expected practices, the MOC provided the opportunity for site-based teams to promote solutions that were 'locally actioned and regionally enabled'. **Measures & Design**: ED Quality Improvement (QI) teams were developed at all sites. The ED Network developed a "QI Bootcamp", a one-day course focused on imparting tools to drive improvements, providing a baseline understanding of how to launch and sustain local QI initiatives. Using Prosci's change approach, an emphasis was placed on using local ingenuity to implement plans, analyze feedback and diagnose gaps. This approach measured utilization of the changes to tangibly link initiatives and change to specific outcomes. As part of this strategy, an online scorecard was created to measure local results against best practice outcomes. The scorecard tracked quantitative access metrics such as ED Length of Stay (EDLOS), Left Without Being Seen rate, and triage time. Measures such as forming a QI team, identifying a QI project and completing a PDSA cycle were included in the scorecard **Evaluation/Results:** The MOC change management strategy was launched in May of 2018. By December 2018 all 13 EDs had formed a local QI team and identified a project. Twelve sites had completed at least one PDSA cycle and 10 sites had at least 75% of their members attend the QI Bootcamp. The scorecard displayed improvements in flow metrics. Highlights include the average arrival to triage time decreasing by 36% at one site, EDLOS for moderately ill patients decreased from 4.8 to 3.4 hours at another, and a community hospital had low acuity patient EDLOS decrease from 3.52 to 2.37 hours. **Discussion/Impact:** A standardized approach to patient access and flow in the ED (MOC), combined with the engaging grass roots approach to inspiring local innovation, allied with a concrete change management approach demonstrated significant results for patients accessing and moving through EDs. This pattern that is more likely to sustain itself because the results are felt and locally owned.

Keywords: emergency access, patient flow, quality improvement and patient safety

MP29

Community based naloxone usability testing

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Background: In Alberta in 2016 more people died from an opioid overdose than from motor vehicle crashes. Naloxone is an opioid antagonist - it can reverse an opioid overdose for a period of 30 to 60 minutes. Naloxone kits are available free at emergency departments and community organizations around the province with training provided at the point of pickup. It is possible that training may be refused or may be forgotten and people are often left to rely solely on the instructions included in the kit. Human centred design can improve the way people interact with overdose instructions. **Aim Statement:** This study will measure the effectiveness and usefulness of prototype community naloxone kit instructions over a six month period of time (2018) in Calgary and Edmonton with the aim to use human centred design principles to improve the way people interpret emergency overdose response directions. **Measures & Design**: Information design experts engaged people with lived experience to provide a process map outlining the current role that educational materials and instructions for community naloxone kits play in responding to an opioid overdose. Alberta Health Services (AHS) Human Factors, in collaboration with AHS harm reduction developed the protocol and administered pre- and post-questionnaire and specific 'performance checkpoints' intended to measure effectiveness and usefulness. A simulated overdose including a mannequin, injection trainer and anatomical paper diagram was designed and a community naloxone kit with instructions setting was provided. Participants were recruited through harm reduction nurses with

pre-existing clinical relationships (experienced group), family and friends of people who use opioids and general public (non-experienced) through the University of Alberta Faculty of Art and Design. **Evaluation/Results:** A total of 30 voluntary participants provided their informed consent and engaged in a simulated overdose scenario using a set of prototype instructions developed by a professional information designer. Through repeated data sampling, the following points were observed and will be integrated in the next iteration of design: It isn't clear to people what opioids are. It isn't clear to people that giving a dose of naloxone will not harm a person, especially if they have not overdosed. Almost none of the participants called 911. People seem to read pictures and text equally in the non-experienced group, but in the experienced group, typically read the pictures. Many participants stated that they knew how to do rescue breaths, but did not perform them correctly. Performing the procedure is a not the same as being asked about how to perform the procedure. **Discussion/Impact:** Even with new instructional prototypes, many participants identified components that were unclear or confusing. The experienced group made less mistakes than the non-experienced group. They seemed to be more invested or interested in saving a friend's life. These instructions will go through another round of design to incorporate feedback from end users. The final product will be part of a larger provincial emergency medicine initiative that includes participant led design and education around emergency response in opioid overdose settings.
Keywords: human centred design, naloxone, quality improvement and patient safety

MP30

Implementing buprenorphine/naloxone in emergency departments for opioid agonist treatment: a quality improvement initiative

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Background: Buprenorphine/naloxone (bup/nal) is a partial opioid agonist/antagonist and recommended first line treatment for opioid use disorder (OUD). Emergency departments (EDs) are a key point of contact with the healthcare system for patients living with OUD. **Aim Statement:** We implemented a multi-disciplinary quality improvement project to screen patients for OUD, initiate bup/nal for eligible individuals, and provide rapid next business day walk-in referrals to addiction clinics in the community. **Measures & Design**: From May to September 2018, our team worked with three ED sites and three addiction clinics to pilot the program. Implementation involved alignment with regulatory requirements, physician education, coordination with pharmacy to ensure in-ED medication access, and nurse education. The project is supported by a full-time project manager, data analyst, operations leaders, physician champions, provincial pharmacy, and the Emergency Strategic Clinical Network leadership team. For our pilot, our evaluation objective was to determine the degree to which our initiation and referral pathway was being utilized. We used administrative data to track the number of patients given bup/nal in ED, their demographics and whether they continued to fill bup/nal prescriptions 30 days after their ED visit. Addiction clinics reported both the number of patients referred to them and the number of patients attending their referral. **Evaluation/Results:** Administrative data shows 568 opioid-related visits to ED pilot sites during the pilot phase. Bup/nal was given to 60 unique patients in the ED during 66 unique visits. There were 32 (53%) male patients and 28 (47%) female patients. Median patient age was 34 (range: 21 to 79). ED visits where bup/nal was given had a median length of stay of 6 hours 57 minutes (IQR: 6 hours 20 minutes) and Canadian Triage Acuity Scores as follows: Level 1 – 1 (2%), Level 2 – 21 (32%), Level 3 – 32 (48%), Level 4 – 11 (17%), Level 5 – 1 (2%). 51 (77%) of these visits led to discharge. 24 (47%) discharged patients given bup/nal in ED continued to fill bup/nal prescriptions 30 days after their index ED visit. EDs also referred 37 patients with OUD to the 3 community clinics, and 16 of those individuals (43%) attended their first follow-up appointment. **Discussion/Impact:** Our pilot project demonstrates that with dedicated resources and broad institutional support, ED patients with OUD can be appropriately initiated on bup/nal and referred to community care.
Keywords: opioids, quality improvement and patient safety, transitions in care

MP31

Safely reducing emergency physician admission rate through audit and feedback

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Background: Most admissions to hospitals occur through the emergency department (ED). The impact of emergency physicians' decisions to admit a patient to hospital can have wide ranging effects on health care spending, hospital congestion and patient outcomes. A growing body of evidence shows that outpatient management of conditions such as diverticulitis, heart failure and pulmonary embolism is both safe, effective and can reduce costs. **Aim Statement:** To support emergency staff in making safe, informed decisions to appropriately reduce admission rates without increasing the rate of patients returning and being admitted. **Measures & Design**: Significant variability in admission rates between emergency physicians exists and no correlation between actual and self-reported admission rates is observed. One means to change behavior is through audit and feedback, however a Cochrane review on this topic concluded that it was only effective if specific conditions were met; findings which were incorporated into this project. An audit tool was created comparing individual physicians' admission and "bounce back" rates to their peers. The tools contained averages for the individual and site for admission and bounce back rates and were shared with physicians every 2 months. Physicians were divided into three equal groups, low, medium and high admitters and targets established. Department heads met with high admitters. **Evaluation/Results:** The project was started in September 2016. Admission rates in the three physician groups were compared in the ten months before September 2016 (prior) and after January 2017 (post). September to December 2016 was considered the "rollout" period and not included in the analysis. Significance was tested using a Permutation test and a p-value cut off level of 5%. Nine emergency departments took part. Seven sites experienced a significant decrease in the admission rate of top admitters, three showed a significant increase in the rate of low admitters and two showed a significant increase in the rate of medium admitters. Pooled results showed a decrease in the admission rates of the top admitters and no significant change to the medium or low admitters. **Discussion/Impact:** Comparing the pre- and post-periods yielded a decrease in admissions of 773 patients on an annualized basis. The

impact of the change in the top five highest admitters at the biggest three hospitals estimated an annualized beds savings of 25.3 beds.
Keywords: hospital admissions, physician performance, quality improvement and patient safety

MP32

Mid-morning huddle: a coordinated team approach to facilitating disposition of older adults

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Background: Older adults in the emergency department (ED) take an increasingly larger portion of resources, have increased length of stay and a higher likelihood of adverse outcomes. In many cases bad planning, multiple vague handovers, and lack of coordinated care exacerbate this problem. With the impending onset of our aging population this is a situation that can be expected to compound in complexity in the years to come. **Aim Statement:** We describe daily interdisciplinary review of ED patients over the age of 75 years (or otherwise identified as a challenging discharge) to discuss barriers and facilitators to discharge/disposition. We will use data to identify the impact of this particular population to ED flow. **Measures & Design**: This initiative developed from our participation in the Acute Care of the Elderly (ACE) Collaborative and applies Plan/Do/Study/Act (PDSA) cycles and run reports to compare: length of stay; Identification of Seniors at Risk (ISAR) screening tool; ED census, admission/discharge rates, bounce back rates, consulting services, and interdisciplinary participation. **Evaluation/ Results:** The average daily census of our ED between the months of July-October of 2018 was over 211 patients/day, of which over 12% were patients 75 years and older. We conducted over 70 huddles, reviewing an average of 11 patients per day. The average length of stay for patients at the time of the huddle was 19 hours, significantly higher than the general emergency population. Next day admission and discharge rates were comparable, 44.8% and 43.1% respectively with the additional patients remaining in the ED with no disposition. Internal medicine was consulted on 30% of all huddle patients and 38.4% subsequently admitted. Thirty day bounce back rates for huddle patients discharged home was 29.3%. Around 60% of patients 75 and older were screened with the ISAR and 55.7% of these were positive (2 or more questions). **Discussion/Impact:** Older patients consume a disproportionate amount of ED resources. Daily interdisciplinary 'geriatric huddles' improved communication between members of the ED team and with consulting services. The huddles enhanced awareness of the unique demands that older adults place on the flow of the ED, and identified opportunities to enhance patient flow.
Keywords: emergency department flow, geriatric patients, quality improvement and patient safety

MP33

Predictors of delirium in older patient at the emergency department: a prospective multicentre derivation study

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Introduction: Delirium is a frequent pathology in the elderly presenting to the emergency department (ED) and is seldom recognised. This condition is associated with many medical complications and has been shown to increase the hospital length-of-stay. The objective of this study was to identify the predictor factors of developing delirium in this high-risk population. **Methods**: Design: This study was part of the multicenter prospective cohort INDEED study. **Participants**: Patients aged 65 and older, initially free of delirium and with an ED stay of 8h or longer, were followed up to 24h after ward admission. **Measures**: Clinical and demographic variables were collected by interview and chart review. A research professional assessed their delirium status twice daily using the Confusion Assessment Method (CAM). **Analyses**: A classification tree was used to select predictors and cut-points that minimized classification error of patients with incident delirium. After literature review, nineteen predictors were considered for inclusion in the model (eight non-modifiable and eleven modifiable factors). **Results**: Among the 605 patients included in this study, incident delirium was detected by the CAM in 69 patients (11.4%). In total, fourteen variables were included in a preliminary model, of which six were intrinsic to the patient and eight were modifiable in the ED. Variables with the greatest impact in the prediction of delirium includes age, cognitive status, ED length of stay, autonomy in daily activities, fragility and mobility during their hospital stay. The diagnostic performance of the model applied to the study sample gave a sensitivity of 78.3% (95% CI: 66.7 to 87.3), a specificity of 100.0% (95% CI: 99.3 to 100.0), a PPV of 100.0% (95% CI: 93.4 to 100.0) and a NPV of 97.3% (95% CI: 95.6 to 98.5). **Conclusion**: The delirium risk model developed in this study shows promising results with elevated sensitivity and specificity values. Considering the limited ability to predict and detect delirium among physicians, the potential increase in sensitivity provided by this tool could be beneficial to patients. This model will ultimately serve to identify high-risk patients with the goal of developing strategies to alter modifiable risk factors and subsequently decrease the incidence of delirium in this population.
Keywords: delirium, elderly, emergency department

MP34

Elder abuse in the emergency department: a systematic scoping review

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Introduction: This systematic scoping review aims to synthetize the available evidence on the epidemiology, risk factors, clinical characteristics, screening tools, prevention strategies, interventions and knowledge of health care providers regarding elder abuse in the emergency department (ED). **Methods**: A systematic literature search was performed using three databases (Medline, Embase and Cochrane Library). Grey literature was scrutinized. Studies were considered eligible when they were observational studies or randomized control trials reporting on elder abuse in the prehospital and/or ED setting. Data extraction was performed independently by two researchers and a qualitative approach was used to synthetize the findings. **Results**: A total of 443 citations were retrieved from which 58 studies published between 1988 and 2018 were finally included. Prevalence of elder abuse following an ED visit varied between 0.01% and 0.03%. Reporting of elder abuse to proper law authorities by ED physicians varied between 2% to 50% of suspected cases. The most common

reported type of elder abuse detected was neglect followed by physical abuse. Female gender was the most consistent factor associated with elder abuse. Cognitive impairment, behavioral problems and psychiatric disorder of the patient or the caregiver were also associated with physical abuse and neglect as well as more frequent ED consultations. Several screening tools have been proposed, but ED-based validation is lacking. Literature on prehospital- or ED-initiated prevention and interventions was scarce without any controlled trial. Health care providers were poorly trained to detect and care for older adults who are suspected of being a victim of elder abuse. **Conclusion**: Elder abuse in the ED is an understudied topic. It remains underrecognized and underreported with ED prevalence rates lower than those in community-dwelling older adults. Health care providers reported lacking appropriate training and knowledge with regards to elder abuse. Dedicated ED studies are required.
Keywords: elder abuse, geriatric, neglect

MP35

Acceptability of older patients' self-assessment in the emergency department (ACCEPTED) – a randomized cross-over trial

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Introduction: It is recommended that seniors consulting to the Emergency Department (ED) undergo a comprehensive geriatric screening, which is difficult for most EDs. Patient self-assessment using electronic tablet could be an interesting solution to this issue. However, the acceptability of self-assessment by older ED patients remains unknown. Assessing acceptability is a fundamental step in evaluating new interventions. The main objective of this project is to compare the acceptability of older patient self-assessment in the ED to that of a standard assessment made by a professional, according to seniors and their caregivers. **Methods**: Design: This randomized crossover design cohort study took place between May and July 2018. **Participants**: 1) Patients aged ≥65 years consulting to the ED, 2) their caregiver, when present. **Measurements**: Patients performed self-assessment of their frailty, cognitive and functional status using an electronic tablet. Acceptability was measured using the Treatment Acceptability and Preferences (TAP) questionnaires. **Analyses**: Descriptive analyses were performed for sociodemographic variables. Scores were adjusted for confounding variables using multivariate linear regression. Thematic content analysis was performed by two independent analysts for qualitative data collected in the TAP's open-ended question. **Results**: A total of 67 patients were included in this study. Mean age was 75.5 ± 8.0 and 55.2% of participants were women. Adjusted mean TAP scores for RA evaluation and patient self-assessment were 2.36 and 2.20, respectively. We found no difference between the two types of evaluations ($p = 0.0831$). When patients are stratified by age groups, patients aged 85 and over ($n = 11$) showed a difference between the TAPs scores, 2.27 for RA evaluation and 1.72 for patient self-assessment ($p = 0.0053$). Our qualitative data shows that this might be attributed to the use of technology, rather than to the self-assessment itself. Data from 9 caregivers showed a 2.42 mean TAP score for RA evaluation and 2.44 for self-assessment. However, this relatively small sample size prevented us to perform statistical tests. **Conclusion**: Our results show that older patients find self-assessment in the ED using an electronic tablet just as acceptable as a standard evaluation by a professional.
Keywords: acceptability, older patients, self-assessment

MP36

Short-term side effects associated with opioids for acute pain

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Introduction: Opioid side effects are common when treating chronic pain. However, the rate of opioid side effects for acute pain has rarely been examined, particularly in the post emergency department (ED) setting. The objective of this study was to evaluate the short-term incidence of opioid induced side effects (constipation, nausea/vomiting, dizziness, and drowsiness) in patients discharged from the ED with an opioid prescription. **Methods**: This was a prospective cohort study of patients aged ≥18 years that visited the ED for an acute pain condition (≤ 2 weeks) and were discharged with an opioid prescription. Patients completed a 14-day diary assessing daily pain medication use and side effects. **Results**: Mean age of the 386 patients included was 55 ± 16 years; 50% were women. During the 2-week follow-up, 80% of patients consumed at least one dose of opioids. Among the patients who used opioids, 38% (95%CI: 33-48) reported constipation, 27% (95%CI:22-32) nausea/vomiting, 30% (95% CI:25-35) dizziness, 51% (95%CI:45-57) drowsiness, and 77% (95%CI:72-82) reported any side effects. Adjusting for age, sex, and pain condition, patients who used opioids were more likely to report any side effect (OR 7.5, 95%CI:4.3-13.3) and constipation (OR 7.5, 95%CI:3.1-17.9). A significant dose response effect was observed for constipation but not for the other side effects. Nausea/vomiting (OR 2.0, 95%CI:1.1-3.6) and dizziness (OR 1.9, 95%CI:1.1-3.4) were associated with oxycodone compared to morphine. **Conclusion**: Similar to chronic pain, opioid side effects are highly prevalent during short-term treatment for acute pain. Physicians should be aware and inform patients about those side effects.
Keywords: adverse events, opioid

MP37

Adherence to Canadian Cardiovascular Society guidelines for prescribing oral anticoagulants to patients with atrial fibrillation in the emergency department

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Introduction: Atrial fibrillation (AF) is the most common arrhythmia treated in the emergency department (ED) and is associated with an increased risk of ischemic stroke. Studies have shown that only oral anticoagulant (OAC) therapy reduces risk of AF related stroke. Our objective was to measure the prescribing practices for OACs for new onset AF at a tertiary ED and two surrounding community EDs, and identify rates of adverse effects within 90 days. The findings of this study will provide quality assurance information for the management of patients with new onset AF. This information has the potential to promote adherence to prescribing guidelines for AF in the ED and the reduction of common adverse events such as ischemic stroke. **Methods**: We conducted a retrospective chart review of 385 patients with new onset AF who presented to the ED between November 2014 to Mach 2018. We defined new onset as symptoms <48 hours and had AF confirmed with electrocardiogram. We recorded the selected therapy choice of cardioversion and/or rate control, gender, age, and assessed CHADS-65 score. We recorded who was prescribed

OAC and those who were referred to cardiology, family medicine, or did not have a documented follow up plan. Patients with a previous history of AF or current anticoagulant therapy were excluded. We recorded if any patients returned to the ED within 90 days with ischemic stroke, AF recurrence, myocardial infarction, other embolic disease or death. **Results**: 86 of 294 (29.5%) of patients who qualified under CHADS-65 received OACs appropriately. 64 of 66 (97.0%) of patients who did not qualify under CHADS-65 did not receive OACs appropriately. 5 patients overall returned within 90 days with ischemic stroke, 4 of those were not prescribed OACs, however this was not statistically significant (P = 0.999). **Conclusion**: This data suggests that physicians in the study are under-prescribing OACs relative to published guidelines. A larger study is necessary to elucidate the effect of ED OAC prescribing patterns on long-term patient outcome.

Keywords: atrial fibrillation, oral anticoagulant, quality improvement and patient safety

MP38

Are we missing pulmonary embolism in acute exacerbations of chronic obstructive pulmonary disease presenting to the emergency department? Multicenter insights into incidence of concomitant disease and yield of testing

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Introduction: Patients with Chronic Obstructive Pulmonary Disease (COPD) often present to the ED with acute exacerbations (AE-COPD) of the disease. A potential occult yet fatal disease that might contribute or accompany an AE-COPD presentation is a pulmonary embolism (PE). Previous studies have investigated and report rates of PE in up to 29% of patients presenting with AE-COPD. Misdiagnoses of PE leads to poor outcomes, however, over-testing for PE also presents with substantial risks to the patient and strain on acute care resources. The goal of this study was to pragmatically identify the prevalence and 30-day incidence of PE in patients presenting with AE-COPD to EDs, as well as the burden and yield of PE investigations. **Methods**: We conducted a retrospective analysis of extracted data for patients □50 years old presenting to one of four emergency departments in Calgary with an AE-COPD since 2013. Patients with a history of outpatient anticoagulation therapy from a community pharmacy were excluded. Each patient chart was reviewed to identify a diagnosis of PE during the admission for an AE-COPD, or 30 days post discharge from an AE-COPD admission or ED presentation. An AE-COPD diagnosis was defined as a primary. **Results**: A total of 9554 AE-COPD ED patient visits were included in the study. 0.69% (95%CI 0.54 to 0.88) were identified to have a PE. 26 of the 66 (39.4%) were diagnosed during an AE-COPD inpatient admission, while 43 (65.2%) were diagnosed within 30 days post-discharge from an AE-COPD admission or ED presentation. Since 2016, 7.4% of AE-COPD patients underwent a CT-PE, while 16.7% underwent a d-dimer. The most common chief complaint in PE patients was dyspnea (75.8%). The mean age of the PE diagnosed was 73.4, with nearly equal representation of both sexes. Many patients had underlying comorbidities, such as hypertension, diabetes, and cancer of various sites, all of which are risk factors for developing a PE. **Conclusion**: The prevalence and 30-day incidence of PE in AE-COPD patients appears to be lower than what was previously reported in the literature. Despite this, a significant proportion of AE-COPD patients were exposed to the risks and burden of a PE work up, with low diagnostic yield. PE investigations in AE-COPD should be used selectively and could inform a quality improvement indicator. A future prospective study would drastically contribute to whether a PE clinical work up should be recommended and of value to patients.

Keywords: chronic obstructive pulmonary disease, pulmonary embolism

MP39

Reducing overcapacity: applying the LEAN model to length of stay in the emergency department

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Introduction: Recently there have been many studies performed on the effectiveness of implementing LEAN principals to improve wait times for emergency departments (EDs), but there have been relatively few studies on implementing these concepts on length of stay (LOS) in the ED. This research aims to explore the initial feasibility of applying the LEAN model to length-of-stay metrics in an ED by identifying areas of non-value added time for patients staying in the ED. **Methods**: In this project we used a sample of 10,000 ED visits at the Health Science Centre in St. John's over a 1-year period and compared patients' LOS in the ED on four criteria: day of the week, hour of presentation, whether laboratory tests were ordered, and whether diagnostic imaging was ordered. Two sets of analyses were then performed. First a two-sided Wilcoxon rank-sum test was used to evaluate whether ordering either lab tests or diagnostic imaging affected LOS. Second a generalized linear model (GLM) was created using a 10-fold cross-validation with a LASSO operator to analyze the effect size and significance of each of the four criteria on LOS. Additionally, a post-test analysis of the GLM was performed on a second sample of 10,000 ED visits in the same 1-year period to assess its predictive power and infer the degree to which a patient's LOS is determined by the four criteria. **Results**: For the Wilcoxon rank-sum test there was no significant difference in LOS for patients who were ordered diagnostic imaging compared to those who were not (p = 0.6998) but there was a statistically significant decrease in LOS for patients who were ordered lab tests compared to those who were not (p = 2.696 x 10-10). When assessing the GLM there were two significant takeaways: ordering lab tests reduced LOS (95% CI = 42.953 - 68.173min reduction), and arriving at the ED on Thursday increased LOS significantly (95% CI = 6.846 – 52.002min increase). **Conclusion**: This preliminary analysis identified several factors that increased patients' LOS in the ED, which would be suitable for potential LEAN interventions. The increase in LOS for both patients who are not ordered lab tests and who visit the ED on Thursday warrant further investigation to identify causal factors. Finally, while this analysis revealed several actionable criteria for improving ED LOS the relatively low predictive power of the final GLM in the post-test analysis (R2 = 0.00363) indicates there are more criteria that influence LOS for exploration in future analyses.

Keywords: lean thinking, process efficiency, quality improvement

MP40

Psychological distress in patients following pulmonary embolism diagnosis

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Introduction: Pulmonary embolism (PE) is a treatable condition, with a low mortality rate (of around 1% in those who are diagnosed

with the condition). The risk of recurrent PE is well managed with long term anticoagulation. Past literature suggests that patients who are diagnosed with PE can go on to experience existential anxiety and symptoms suggestive of post-traumatic stress disorder (PTSD). This study aimed to evaluate the mental and emotional experiences of PE patients through the lens of PTSD, and the factors involved in psychological distress following a PE diagnosis. **Methods**: Semi-structured interviews were conducted with PE patients at the Juravinski Hospital thrombosis clinic in Hamilton, Ontario. Interview questions were based on DSM-5 criteria of PTSD and relevant existing literature. The transcripts were analyzed by two researchers based on an approach that considers both the content of patients' accounts as well as the way that patients choose to interpret and deliver those accounts, to develop major themes associated with psychological distress. **Results**: A total of 37 patients, ranging from 28 to 85 years of age, were interviewed. The patients' accounts suggested that the manner in which a PE diagnosis was delivered by an emergency physician was a significant factor in the degree to which they experienced psychological distress. For example, patients reported focusing on words suggesting that they were 'a ticking time-bomb' or that 'a lot of people don't get through this,' which introduced a degree of panic. A number of patients continued to focus on these words, months or years after their diagnosis. Some feared that they could have recurrent PE which could lead to death. Diagnoses that were delivered calmly with thorough explanations of why a patient experienced PE-related symptoms and how they will be treated, helped to minimize any subsequent anxiety. Patients initially misdiagnosed with an alternative condition in the ED also expressed feelings of anxiety and distress. The presence of physically and mentally distressing symptoms was also a factor which contributed to mental distress and anxiety regarding a PE recurrence. **Conclusion**: Caution should be taken in the delivery of PE diagnosis in the emergency department. Over-emphasis on the severity and life-threatening nature of PE should be avoided to reduce psychological distress.

Keywords: diagnosis, embolism, psychology

MP41

Feeling the flow: an evaluation of the GridlockED workshop experience

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Introduction: GridlockED is an educational (or "serious") game recently developed by a team at McMaster to teach medical learners about patient flow in the emergency department (ED). Beyond patient flow, we were cognizant that the game could provide additional learning opportunities for learners. The goal of this program evaluation project was to investigate workshop attendees' experiences and identify what areas they found most educational. **Methods**: A GridlockED board game workshop was developed and delivered in several locations over the fall of 2018. Workshops targeted medical learners and were organized by local emergency medicine interest groups. After a standardized video-based introduction to the game concept and rules, the learners played GridlockED for approximately 90 minutes. After the play session, learners completed an anonymous survey consisting of 7-point Likert scale questions about their experience. They were also asked to identify the learning domains for which GridlockED was developed (Patient Flow, Communication and Teamwork, and ED Basics), and were asked via free-text to identify learning objectives from their experience. We received an exemption for this study from our institutional review board. **Results**: We had 25 respondents (24 medical students and 1 resident). Trainees rated GridlockED as both enjoyable to play and as a meaningful educational experience, with an average rating of 6.56 (SD 0.94) for enjoyability and 6.44 (0.92) for education. When asked what targeted learning domain was most helpful, 45% of students identified patient flow, 37% teamwork and communication, and only 18% ED basics. When asked to identify their top three areas of learning in open-ended responses, students actually identified resource management most frequently (48%), with improved communication skills (40%) as the second most prominent learning objective. Other interesting self-identified learning points were: a greater appreciation of the role of various providers (24%), the unpredictability of ED care (12%), and how things can go wrong (12%). **Conclusion**: Medical learners find GridlockED to be both enjoyable and educational. In our targeted areas of learning they found patient flow to be the most educational, but self-identified multiple other areas for learning. Students identified resource management and communication as key areas of learning, suggesting that future workshops might be designed specifically to teach these skills.

Keywords: medical education, program evaluation, serious games

MP42

Program assessment: taking stock of the current state of Canadian undergraduate medical education in procedural skills curricula

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Introduction: In order to better characterize procedural skills curricula in Canada, a national survey was conducted. The objectives of the survey were: (i) to characterize procedural skills education currently employed in pre-clerkship and clerkship curricula; (ii) to determine what skills physician-educators think medical students should know upon graduation; and (iii) to identify physician-educator perceptions regarding the development of pre-clerkship procedural curriculum. **Methods**: A web-based survey was distributed to 201 clinician-educators across Canada's 17 medical schools. Respondents were directed to an individualized survey based on their self-identified roles at their institution. Respondents were asked demographic questions, what procedural skills are being taught and in what setting at their institution, and their opinions on the value of a pre-clerkship procedural curriculum. **Results**: From the 17 school's surveyed, 12 schools responded, with 8 schools responding "yes" that they had a clerkship procedural curriculum. For a pre-clerkship procedural curriculum, only 4 schools responded "yes". The 5 of the top 10 procedurals skills identified that medical students should know upon graduation, in order, are: IV Access, Airway Management/Ventilator Management, Local anesthesia/field block, Casting, Spontaneous Vaginal Delivery. On a Likert scale, clinician-educators strongly supported a pre-clerkship procedural curriculum (median = 4.00/5.00, mode = 5.00/5.00), and they believed it would decrease anxiety (median = 4.00/5.00), increase confidence (median = 4.00/5.00), and increase technical ability (median = 3.00/5.00) in incoming clerks. **Conclusion**: Across Canada, the state of undergraduate medical education procedural skills education is inconsistent. With the identification of the Top 10 procedural skills medical students should know upon graduation, the learning objectives of a formal curriculum can

be developed. With overwhelming support from physician-educators, a formal pre-clerkship procedural curriculum is poised to redefine the landscape of procedural care for a whole new generation of physicians.
Keywords: pre-clerkship, procedural curriculum, survey

MP43

Evaluation of undergraduate point of care ultrasound instruction in a rural Canadian medical school

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Introduction: Point of care ultrasound is a burgeoning tool in clinical medicine and its utility has been demonstrated in a variety of contexts. It may be especially useful in rural areas where access to other imaging equipment (such as CT) is limited. However, there exists debate about the utility of teaching ultrasound theory and technique to medical undergraduates, particularly those in their first two years of study. This study evaluated the efficacy of teaching undergraduate-tailored ultrasound training sessions to first and second-year medical students at the Northern Ontario School of Medicine (NOSM), a rural-focused medical institution. **Methods**: Sixty students participated in tailored ultrasound teaching sessions that involved both lecture and hands-on components. Participating students were assessed following each session, as well as at study completion, in terms of ultrasound knowledge, anatomy, pathology, orientation, and interpretation of computerized tomography (CT) scans (transferability). Participants' performance was measured against a control group of their peers. Program evaluation was completed using Likert-type scales to determine participant comfort with ultrasound before and after the training, and areas of strength and improvement. **Results**: Participating students showed statistically significant improvement in ultrasound interpretation and anatomical orientation with trends toward improved anatomy and pathology knowledge, and ability to interpret computerized tomography (CT) scans compared to controls. Students participating in the course expressed improved comfort with ultrasound techniques and desire for future integration of ultrasound into their training, but noted that increasing frequency of training sessions might have improved retention and confidence. **Conclusion**: Results suggest that using an undergraduate-focused and system-specific ultrasound training course yields retention in ultrasound interpretation ability and objective improvement in relational anatomy knowledge. Trends toward improvement in general anatomy, pathology and CT interpretation suggest areas of future study.
Keywords: medical education, rural innovation, ultrasound

MP44

Emergency department perceptions of routine in-situ simulation

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Introduction: Emergency Department (ED) health care professionals are responsible for providing team-based care to critically ill patients. Given this complex responsibility, simulation training is paramount. In situ simulation (ISS) has many cited benefits as a training strategy that targets on-duty staff and occurs in the actual patient environment. Several evidence-based frameworks identify staff buy-in as essential for successful ISS implementation, however, the attitudes of interdisciplinary front-line ED staff in this regard are unknown. The purpose of this study is to identify contextual trends in interdisciplinary opinions on routine ISS in the ED. **Methods**: Qualitative and quantitative review, exploring the self-reported attitudes of interdisciplinary ED staff: before, during and after the implementation of a routine ISS pilot program (5 sessions in 5 months) at the Charles V Keating Emergency and Trauma Center in Halifax from Feb-Nov, 2018. **Results**: 149 surveys were received. Baseline support for ISS was high; 83% of respondents believed that the advantages of ISS outweigh the challenges and 47% favoured simulation in the ED, relative the sim bay (26%) and 28% were indifferent. The attitudes of direct participants in ISS were very positive, with 88% believing that the benefits outweighed the challenges after participation and 91% believing that they personally benefited from participating. A department wide post-ISS pilot survey suggested a slight decrease in support. Support for ISS dropped from 83% to 67%, a statistically insignificant reduction ($p = 0.098$) but a sizeable change that warrants further investigation. Most notably respondents reported increased support for simulation training in a simulation bay relative to ISS in the ED. Respondents still regarded simulation highly overall. Interestingly, when the results were stratified by position, staff physicians were the least positive. **Conclusion**: Pre-pilot or baseline opinions of ISS were very positive, and participants all responded positively to the simulations. This study generates valuable insight into the perceptions of interdisciplinary ED staff regarding the implementation and perceived impact of routine ISS. This evidence can be used to inform future programming, though further investigation is warranted into why opinions post-intervention may have changed at the department level.
Keywords: emergency department, in situ simulation, interdisciplinary

MP45

Rate control management of rapid atrial fibrillation in the emergency department

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Introduction: The Canadian Association of Emergency Physicians (CAEP) Atrial Fibrillation (AF) Guidelines prioritizes early cardioversion and discharge home in the management of rapid AF, however not all patients can be safely cardioverted in the emergency department (ED). Given limited ED-based evidence on rate control, we sought to better understand the burden of disease in AF patients not managed by rhythm control and identify opportunities for improved care. **Methods**: We conducted a health records review of consecutive AF patient visits at two Canadian academic hospital EDs over a 12-month period. We included all patients ≥18 years with AF on electrocardiogram, a heart rate ≥100 beats per minute (bpm), and who did not receive cardioversion. Outcomes included: (1) incidence of patients managed by rate control; (2) specific rate control management practices including choice of agent, route of administration, dosing, and timing; (3) adverse events; (4) compliance with CAEP AF Guidelines; and (5) disposition and outcomes. **Results**: Of 972 rapid AF patient visits, 307 were excluded and 665 were included, with mean age 77.2, female 51.6%. Of those included, 43.0% were given rate control medications, most common being metoprolol (72.0%). Admission to hospital occurred in 61.4% of visits, and 77.9% of AF cases were secondary to another medical condition. In

those given rate control medications, 9.1% suffered adverse events and only 55.6% had a final ED heart rate ≤100 bpm. Inappropriate use of rate control medications was found in 44.8% of cases, specifically inappropriate choice of agent (4.5%), inappropriate route of administration (26.9%), over-dosed (2.4%), under-dosed (5.2%), and inadequate timing (5.6%). **Conclusion**: We demonstrated that for rapid AF patients not receiving cardioversion, most cases were secondary to a medical cause and of those receiving rate control, there were a concerning number of adverse events related to inappropriate choice of agent, route of administration, dosage, and timing. Moving forward, better awareness of the CAEP AF Guidelines by ED physicians will ensure safer use of rate control agents for rapid AF patients.
Keywords: atrial fibrillation, emergency department, rate control

MP46

Creatine kinase in the emergency department: antiquated relic or useful adjunct in diagnosis of NSTEMI: A systematic review

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Introduction: The diagnosis of non-ST elevated myocardial infarction (NSTEMI) depends on a combination of history, ECG and cardiac biomarkers. Many hospitals continue to automatically order less sensitive and specific biomarkers such as Creatine Kinase (CK) alongside cardiac Troponin (cTn) as part of an extended panel of bloodwork for work-up of patients with suspected NSTEMI. **Methods**: We undertook a systematic review to assess the usefulness of CK measurements in addition to cTnI in NSTEMI diagnosis. Medline, EMBASE and Cochrane databases were searched from 1995 until May 31, 2018. We added additional articles after reviewing the reference list of pertinent articles and consulting experts. A total of 1123 papers were screened, of which 8 were included in the final analysis. These papers all compared CK and troponin (TnI) testing in the diagnosis of NSTEMI. **Results**: Of the 8 papers included in the analysis none showed CK having a greater sensitivity or specificity than the TnI assays. Furthermore, no paper originally published evidence of CK diagnosing NSTEMI when Troponin was negative. One author, when contacted, described 10% of patients diagnosed with NSTEMI as having discordant data (eg. +CK, -Troponin). However, the outcome data such as angiography and echocardiography were not available for these patients, making definitive diagnosis unclear. **Conclusion**: Troponin has consistently shown to have greater sensitivity and specificity than CK in the diagnosis of NSTEMI with CK adding no improvements in diagnosis. We believe CK should not be used in the emergency department work-up for NSTEMI diagnosis.
Keywords: acute coronary syndrome, creatine kinase, non-ST elevated myocardial infarction

MP47

A systematic review of local complications from central and peripheral administration of vasopressors in the pediatric population

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Introduction: Vasopressors are routinely utilized to treat systemic shock, a significant source of morbidity and mortality in the pediatric population. Local tissue ischemia has been classically implicated with peripheral use of these medications. However, peripheral administration (PVC) has theoretical benefits, and avoids many of the risks associated with central venous catheter (CVC) placement. There appears to be paucity of literature in pediatrics examining this subject. We conducted a systematic review investigating local tissue complications and extravasations of both PVC and CVC administration in the pediatric population. Specifically we examined the type of vasopressor used, the site used, the duration of the infusion, and finally the overall outcome for patients. **Methods**: A systematic search was conducted using PubMed, Embase, Cochrane, and CINAHL databases. Terms for IV administration, specific vasopressor use, complication of interest, and pediatric population were combined. We included studies that satisfied our predetermined criteria. All search results were imported into Covidence software where the primary author conducted an initial title and abstract review. Papers that met the pre-identified criteria were selected for full text review. Papers selected for full text review were independently reviewed by two of the authors. Agreement between the authors was measured utilizing a κ statistic. **Results**: Our search yielded 14784 results, of which 237 were assessed for full text review. The κ between the authors is pending. 13 studies were selected for final inclusion. There were 14 patients with 15 total events. 13 were from PVC use while 2 occurred with CVC's. 11 of the 13 complications associated with PVC administration occurred through extravasation, with 2 events from local ischemia. 9 children were administered dopamine, 1 norepinephrine, and 14 were on multiple vasopressors. 3/13 events were "proximal" or occurring at or above the AC or popliteal fossa while 10/13 events were "distal". The average time to ischemic injury or extravasation peripherally was 56.1 hours with a range of 1.5 to 360 hours. 9 of the total patients did not have any long-term sequelae. One patient had toe amputations, while two others died because of illness. One CVC patient died as a result extravasation leading to asphyxiation. **Conclusion**: There is a lack of significant literature reporting serious adverse events related to peripheral or central administration of vasopressors in the pediatric population.
Keywords: ischemia, pediatrics, vasopressors

MP48

White blood cells count and C-reactive protein performance to identify severe bacterial infection in the fever without a source workup of infants 22 to 60 days old

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Introduction: Identification of severe bacterial infections (SBI) among infants presenting to the emergency department (ED) for fever without a source (FWS) remains challenging. Controversies persist on the usefulness of blood biomarkers, especially when used for assessing infants 22 to 60 days old. Although C-reactive protein (CRP) and white blood cells count (leucocytes) are commonly prescribed, this practice relies on poor and conflicting evidence. Our objective was to determine the performance of those two markers at identifying SBI. **Methods**: This is a sub-analysis of an ongoing retrospective cohort study conducted in an academic pediatric ED in Quebec City, that aims to determine whether a lumbar puncture should routinely be performed in the FWS workup of 22 to 60 days old infants. All consecutive charts of eligible febrile infants were reviewed. Premature infants (<37 weeks), as well as infants with chronic diseases, immunodeficiency, previous antimicrobial therapy, in-dwelling

catheters, or septic shock were excluded. Among others, data related to final diagnosis and investigations were gathered. Sensitivity, specificity, positive (PPV) and negative (NPV) predictive values, positive (LR+) and negative (LR-) likelihood ratios were estimated for each blood biomarkers. **Results**: Out of 1261 charts reviewed, 920 patients were included in this analysis. SBI prevalence was 13.0% (95%CI: 10.9-15.2) among infants of our cohort. The sensitivity, specificity, PPV, NPV, LR+ and LR- of the leucocytes <5000 or≥15000/□L were 43% (95%CI: 34-53%), 80% (95%CI: 77-83%), 25% (95% CI: 21-30%), 90% (95%CI: 88-91%), 2.1 (95%CI: 1.7-2.8), and 0.72 (95%CI: 0.61-0.84), respectively. The sensitivity, specificity, PPV and NPV of CRP >= 25 mg/L were 46% (95%CI: 37-56%), 96% (95%CI: 94-97%), 65% (95%CI: 55-73%), and 91% (95%CI: 89-92%), respectively. ROC curves analysis indicates that a CRP≥25 mg/L offers the best LR+ (10.4; 95%CI: 6.9-15.6) with a corresponding LR- of 0.56 (95%CI: 0.47-0.67). **Conclusion**: When evaluating febrile infants in the ED, leucocytes appear to have limited added value, while CRP≥25 mg/L significantly increases the pre-test probability of SBI. CRP should be considered for inclusion in the workup of FWS for infants of 22 to 60 days of age.

Keywords: fever without a source, infants 22 to 60 days old, serious bacterial infection

MP49

Prehospital oxygen administration to suspected acute myocardial infarction patients: a systematic review and meta-analysis

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Introduction: Oxygen is commonly administered to prehospital patients presenting with acute myocardial infarction (AMI). We conducted a systematic review to determine if oxygen administration, in AMI, impacts patient outcomes. **Methods**: We conducted a systematic search using MeSH terms and keywords in Medline, Embase, Cochrane Database of Systematic Reviews, Cochrane Central, clinicaltrials.gov and ISRCTN for relevant randomized controlled trials and observational studies comparing oxygen administration and no oxygen administration. The outcomes of interest were: mortality (≤30 days, in-hospital, and intermediate 2-11 months), infarct size, and major adverse cardiac events (MACE). Risk of Bias assessments were performed and GRADE methodology was employed to assess quality and overall confidence in the effect estimate. A meta-analysis was performed using RevMan 5 software. **Results**: Our search yielded 1192 citations of which 48 studies were reviewed as full texts and a total of 8 studies were included in the analysis. All evidence was considered low or very low quality. Five studies reported on mortality finding low quality evidence of no benefit or harm. Low quality evidence demonstrated no benefit or harm from supplemental oxygen administration. Similarly, no benefit or harm was found in MACE or infarct size (very low quality). Normoxia was defined as oxygen saturation measured via pulse oximetry at ≥90% in one recent study and ≥94% in another. **Conclusion**: We found low and very low quality evidence that the administration of supplemental oxygen to normoxic patients experiencing AMI, provides no clear harm nor benefit for mortality or MACE. The evidence on infarct size was inconsistent and warrants further prospective examination.

Keywords: acute myocardial infarction, emergency medical services, oxygen

MP50

National survey of 9-1-1 ambulance communication centers' resources related to prehospital recognition of agonal breathing and cardiac arrest

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Introduction: 9-1-1 telecommunicators receive minimal education on agonal breathing, often resulting in unrecognized out-of-hospital cardiac arrest (OHCA). We successfully piloted an educational intervention that significantly improved telecommunicators' OHCA recognition and bystander CPR rates in Ottawa. We sought to better understand the operations of Canadian 9-1-1 communications centers (CC) in preparation for a multi-centre study of this intervention. **Methods**: We conducted a National survey of all Canadian CCs. Survey domains included information on organizational structure, dispatch system used, education curriculum, and performance monitoring. It was peer-reviewed, translated in French, pilot-tested, and distributed electronically using a modified Dillman method. We designated respondents in each CC before distribution and used targeted follow-up and small incentives to increase response rate. Respondents also described functioning of neighboring CCs if known. **Results**: We received information from 51/51 provincial and 1/25 territorial CCs, representing 99.7% of the Canadian population. CCs largely utilize the Medical Dispatch Priority System (MPDS) platform (93%), many are Province/Ministry regulated (50%) and most require a High School diploma as minimum entry level education (78%). Telecommunicators receive initial in-class training (median 1.3 months, IQR 0.3-1.9; range 0.1-2.2), often followed by a preceptorship (84.4%) (median 1.0 months, IQR 0.7-1.7; range 0.4-6.0). Educational curriculum includes information on agonal breathing in 41% of CC, without audio examples in 34%. Among responding CCs, over 39,000 suspected OHCA 9-1-1 calls are received annually. Few CCs maintain local performance statistics on OHCA recognition (25%), bystander CPR rates (25%) or survival rates (50%). Most (97%) expressed interest in future research collaborations. **Conclusion**: Most Canadian telecommunicators receive no or minimal education in recognizing agonal breathing. Further training and improved OHCA monitoring may assist recognition and enhance outcomes.

Keywords: agonal breathing, cardiac arrest, telecommunication-assisted cardiopulmonary resuscitation

MP51

Assessment of predictors of deterioration in mild traumatic brain injury with intracranial hemorrhage at emergency department

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Introduction: Mild traumatic brain injury (mTBI) with intracranial hemorrhage (ICH) is a common cause of Emergency Department (ED) visits. Over the past years, several authors have debated the relevance of radiological and clinical follow-up of these patients, as the main challenge is to identify patients at risk of clinical deterioration. **Objectives**: To determine whether demographic, clinical or

radiological variables can predict patient deterioration. **Methods**: Design: An historical cohort was constituted in two level-1 trauma centers (Chu de Quebec - Hôpital de l'Enfant-Jésus (Québec City) and Hôpital du Sacré-Coeur (Montréal)). **Participants**: Medical records of mTBI patients aged ⩾16 with an ICH were reviewed using a standardized data collection tool. Consecutive medical records were reviewed from the end of 2017 backwards until sample saturation. **Measures**: Deterioration was defined as either death, deterioration of the control CT scan according to the radiologist, clinical deterioration or neurosurgical intervention. **Analyses**: Logistic regression analyses were performed to ascertain predictors of deterioration. Interobserver agreement was calculated. **Results**: A total of 274 patients were included in our analyses. Mean age was 60.8 and 68.9% (n = 188) were men. Four variables were found to be associated with all outcomes: radiological deterioration, clinical deterioration, death, and neurosurgical intervention. Diabetes (odds ratio (OR) = 2.6, 95% CI [0.97-6.94]), confusion as an initial symptom (OR = 2.8, 95% CI [1.42-5.61]), anticoagulation (OR = 2.8, 95% CI [1.01-7.84]) and significant subdural hemorrhage (≥4 mm) (OR = 3.4, 95% CI [1.42-5.61]) seen on the first computed tomography scan were strongly associated with these outcomes. Age had a neutral effect (OR = 1.01, 95% CI [0.99-1.03]) while high initial Glasgow Coma score seemed to have a protective effect (OR = 0.4, 95% CI [0.24-0.69]). Radiological deterioration was not systematically associated with clinical deterioration. As for the 46 patients with a deterioration of CT scan, only 30.4% vs. 69.5% without deterioration (p = 0.0035) showed a clinical deterioration. **Conclusion**: Diabetes, anticoagulation, significant subdural hemorrhage and confusion as an initial symptom seem to be predictors of deterioration following a mild traumatic brain injury with positive CT scan.

Keywords: emergency department, mild traumatic brain injury with intracranial hemorrhage, predictors of deterioration

MP52

Prehospital opioid administration to acute myocardial infarction patients: a systematic review

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Introduction: Opioids are routinely administered for analgesia to prehospital patients experiencing chest discomfort from acute myocardial infarction (AMI). We conducted a systematic review to determine if opioid administration impacts patient outcomes. **Methods**: We conducted a systematic search using MeSH terms and keywords in Medline, Embase, Cochrane Database of Systematic Reviews, Cochrane Central and Clinicaltrials.gov for relevant randomized controlled trials and observational studies comparing opioid administration in AMI patients from 1990 to 2017. The outcomes of interest were: all-cause short-term mortality (≤30 days), major adverse cardiac events (MACE), platelet activity and aggregation, immediate adverse events, infarct size, and analgesia. Included studies were hand searched for additional citations. Risk of Bias assessments were performed and GRADE methodology was employed to assess quality and overall confidence in the effect estimate. **Results**: Our search yielded 3001 citations of which 19 studies were reviewed as full texts and a total of 9 studies were included in the analysis. The studies predominantly reported on morphine as the opioid. Five studies reported on mortality (≤30 days), seven on MACE, four on platelet activity and aggregation, two on immediate adverse events, two on infarct size and none on analgesic effect. We found low quality evidence suggesting no benefit or harm in terms of mortality or MACE. However, low quality evidence indicates that opioids increase infarct size. Low-quality evidence also shows reduced serum P2Y12 (eg: clopidogrel and ticagrelor) active metabolite levels and increased platelet reactivity in the first several hours post administration following an increase in vomiting. **Conclusion**: We find low and very low quality evidence that the administration of opioids in STEMI may be adversely related to vomiting and some surrogate outcomes including increased infarct size, reduced serum P2Y12 levels, and increased platelet activity. We found no clear benefit or harm on patient-oriented clinical outcomes including mortality.

Keywords: acute myocardial infarction, emergency medical services, opioid

MP53

Management of cutaneous abscesses in the emergency department: a survey of Canadian practice patterns

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Introduction: The treatment of cutaneous abscesses in the Emergency Department (ED) is common. While most sources describe only incision and drainage (I&D) followed by healing through secondary intention, recent literature suggests that primary repair following I&D results in similar rates of healing as well as treatment failures when compared to standard care in the ED. The primary goal of this research project was to describe the variability in practice with respect to self-reported management of abscesses among Canadian ED physicians and explore potential reluctance in adopting primary repair as a management strategy. **Methods**: An electronic survey was distributed through the Canadian Association of Emergency Physicians (CAEP). Practicing physician members of CAEP were invited to complete the survey. The 9-question survey probed the willingness of physicians to perform primary closure of abscess in the ED as well as factors that dissuade them from performing this type of closure. The primary outcome was the quantification of practice variability among ED physicians with respect to abscess closure in the ED. The data was presented with simple descriptive statistics. **Results**: 217 surveys were completed out of 1145 eligible physicians. Physicians working at academic centres comprised 53% of responses, with 47% coming from community centres. Over half of responses were from physicians in practice at least ten years (65.9%). The overwhelming majority of physicians indicated that they manage abscesses following I&D by secondary closure (96.3%). The two main concerns dissuading respondents from performing primary closure of abscesses included risk of treatment failure (47.8%) and the procedure not being considered standard of care (36.7%). Despite these concerns, 67.3% of physicians indicated a willingness to perform primary closure if further evidence supported its use. These physicians were most likely to consider primary closure at the head and neck, breast, trunk, and extremities, however, only 1.5% considered primary closure appropriate for perianal or pilonidal abscesses. **Conclusion**: This study demonstrates that almost all Canadian ED physicians, regardless of experience or practice centre, manage cutaneous abscesses with I&D followed by healing via secondary intention. With increasing evidence supporting the use of primary closure, many physicians may be willing to adopt primary closure as part of the management of cutaneous abscesses in the ED.

Keywords: abscess, emergency department, primary closure

MP54

The prevalence and pattern of drugs detected in injured drivers in four Canadian provinces

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Introduction: Many drugs, including cannabis and alcohol, cause impairment and contribute to motor vehicle collisions (MVCs). Policy makers require knowledge of the prevalence of drug use in crash-involved drivers, and types of drugs used in order to develop effective prevention programs. This issue is particularly relevant with the recent legalization of cannabis. We aim to study the prevalence of alcohol, cannabis, sedating medications, and other drugs in injured drivers from 4 Canadian Provinces. **Methods**: This prospective cohort study obtained excess clinical blood samples from consecutive injured drivers who attended a participating Canadian trauma centre following a MVC. Blood samples were analyzed using a broad spectrum toxicology screen capable of detecting cannabinoids, cocaine, amphetamines (including their major analogues), and opioids as well as psychotropic pharmaceuticals (including antihistamines, benzodiazepines, other hypnotics, and sedating antidepressants). Alcohol and cannabinoids were quantified. Health records were reviewed to extract demographic, medical, and MVC information using a standardized data collection tool. **Results**: This study has been collecting data in 4 trauma centres in British Columbia (BC) since 2011 and was launched in 2 trauma centres in Alberta (AB), 1 in Saskatchewan (SK), and 2 in Ontario (ON) in 2018. In preliminary results from BC (n = 2412), 8% of injured drivers tested positive for THC and 13% for alcohol. Preliminary results from other provinces (n = 301) suggest a regional variation in prevalence of drivers testing positive for THC (10% - 27%), alcohol (17% - 29%), and other drugs. By May 2018, an estimated 4500 cases from BC, 600 from AB, 150 from SK, and 650 from ON will have been analyzed. We will report the prevalence of positive tests for alcohol, THC, other recreational drugs, and sedating medications, pre and post cannabis legalization. The number of cases with alcohol and/or THC levels above Canadian per se limits will also be reported. Results will be reported according to province, driver sex, age, single vs. multi vehicle crashes, and requirement for hospital admission. **Conclusion**: This will be among the largest international datasets on drug use by injured drivers. Our findings will provide patterns of drug and alcohol impairment in 4 Canadian provinces pre and post cannabis legalization. The significance of these findings and implication for impaired driving policy and prevention programs in Canada will be discussed.

Keywords: cannabis, drugs, motor vehicle collisions

MP55

Characteristics associated with biphasic reactions in an adult population

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Introduction: Biphasic anaphylactic reactions are a concern in emergency medicine. Risk factors associated with this type of reaction remain ill-defined. The aim of this study was to investigate elements associated with biphasic anaphylactic reactions and to determine the impact of anaphylaxis treatments on biphasic reactions. **Methods**: From the multicenter Cross-Canada Anaphylaxis Registry prospective cohort, we selected adults (≥18 years) with a visit to the emergency department (ED) of Sacré-Cœur Hospital, an urban tertiary-care hospital. Then, a structured chart review was done to collect additional information on types and timing of treatments for the initial anaphylactic reaction, presence and treatment of biphasic reactions during the initial ED visit or upon patients' return. Biphasic reactions were defined by the recurrence of any anaphylaxis symptoms within 72 hours of a resolved anaphylaxis episode. Potential factors associated with biphasic reactions were studied using Chi-Square and Mann-Whitney tests. **Results**: Patients with anaphylaxis were enrolled between April 2014 and February 2018. From the cohort, 401 adult patients were identified. We found 37 patients who developed a biphasic reaction. Amongst them, 33 received treatments and 9 required more than one dose of intramuscular epinephrine. None of the biphasic reaction patients required intravenous epinephrine, other vasopressors, ICU admission, or endotracheal intubation. Biphasic reactions appeared in a median time of 13.3h after the initial reaction ranging from 1.1h to 69.6h (IQR 30.2). There was no difference in age or gender of patients who developed a biphasic reaction compared those who did not. Pertinent past medical history, daily medications, mean of arrival to the ED, allergen type, ingestion route, or initial symptoms during the anaphylaxis episode were not significantly different in the two groups. Treatment with corticosteroids was similar in the two groups (9.0% vs. 8.1% p = 0.82). Treatment, dose and route of administration of epinephrine was not different in the two groups but longer delays before treatment with the first dose of epinephrine was more frequent in biphasic reaction patients (median delay of 64 minutes, p = 0.015). **Conclusion**: No patient characteristic, allergen, route of ingestion, symptom, nor treatment with corticosteroids has shown to be significantly different in patients with and without biphasic reactions. Delayed treatment with epinephrine is significantly associated with biphasic reactions.

Keywords: anaphylaxis, biphasic anaphylaxis, treatment

MP56

A National survey of burnout and mentorship programs amongst Royal College Emergency Medicine residents

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Introduction: In recent years, there has been growing interest in the field of physician wellness and burnout. Past research has shown that the prevalence of burnout is non-uniform between specialties and is most prevalent amongst emergency medicine physicians. Additionally, burnout can be observed amongst individuals early in their medical careers, including medical students and residents. To date, there is no national perspective of burnout amongst Canadian Royal College of Emergency Medicine (EM) residents. Our study looks to provide a national survey of burnout in this population as well as characterize mentorship programs at training sites. **Methods**: An anonymous electronic survey was e-mailed to Canadian EM residents via local program directors. Characteristics of mentor-mentee relationships and quality of residents' mentorship experiences were assessed on a 6-point Likert scale. The Maslach Burnout Inventory – Human Services Survey (MBI-HSS) for medical personnel was used to assess burnout on three dimensions (emotional exhaustion, depersonalization and personal accomplishment). Burnout was dichotomized as

present or absent if the MBI criteria are met (emotional exhaustion score > 26 or depersonalization score > 9 or personal accomplishment <34). **Results**: To date, 52 responses have been collected. Respondents are primarily male (63%) and in their PGY year 1-3 (71%). Responses were collected from 6/14 (43%) of eligible programs. 84% of residents currently had an emergency medicine mentor. Of these, 8% were dissatisfied with their residency's mentorship program and 55% were satisfied/very satisfied. 72% of residents met the threshold for burnout in at least one dimension of the MBI (3 dimensions = 17%; 2 dimensions = 17%; 1 dimension = 38%) and 13% cited considering suicide during their training. **Conclusion**: Results thus far suggest significant burnout amongst Royal College of Emergency Medicine residents. Alarmingly, 13% of responders cited having contemplated suicide during their training. These results point to an important opportunity to better support EM residents during their training to improve wellness and reduce burnout. Our findings suggest a high prevalence of residents with established mentors and future analyses will examine the correlation between mentorship characteristics and resident burnout levels.
Keywords: burnout, mentorship, residents

Poster Presentations

P001

Continuing professional development and faculty development: launching continuous practice enhancement for academic emergency physicians

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Innovation Concept: Emergency medicine physicians must maintain a broad knowledge base and procedural skillset while fulfilling their academic roles as teachers, researchers and administrators. Most academic departments do not have a regular, affordable, formal continuing professional development (CPD) and faculty development (FD) curriculum for their staff. We set out to design and implement a novel continuous practice enhancement program to address this issue. **Methods**: Strategic planning by the Ottawa academic Department of EM identified CPD and FD as priorities. A program was created to support high quality, monthly CPD/FD courses provided by physicians. We had 5 goals: (1) enhance clinical and academic skills, (2) disseminate group best practices, (3) sustain skills in high impact/low frequency scenarios, (4) support physician academic careers, and (5) acquire new procedural skills. A CPD/FD Committee composed of local meded experts and experienced clinical teachers was tasked with overseeing the creation and evaluation of these sessions. **Curriculum, Tool or Material**: The longitudinal curriculum was informed by perceived needs (group survey), ascribed needs (M&M rounds, physician metrics and departmental leadership priorities) and participant feedback. The committee identified local experts to present on their areas of expertise in order to promote group best practice. Topics to-date have included clinical skills updates, teaching and coaching strategies and academic career planning. A comprehensive monthly simulation-based curriculum was rolled out simultaneously to give participants the opportunity to develop crisis resource management and critical care skills. Except for sessions requiring advanced equipment or cadavers, sessions are financed by academic funds and free for participants. **Conclusion**: Faculty academic learning and engagement is an important goal and participation in this curriculum is reviewed at each physician's annual reappointment. To-date, 18 physicians (21% of our group) have presented topics and 92% of physicians have participated in at least one session with 63% having attended three or more. Evaluations have been overwhelmingly positive, and a recent survey identified the CPD/FD program as a significant contributor to our physicians' wellness. We introduced an innovative, structured CPD/FD program in response to perceived and ascribed needs of our physicians and departmental leadership. Our successful CPD/FD curriculum represents a model for other departments who are considering similar initiatives.
Keywords: continuing professional development, faculty development, innovation in EM education

P002

Effectiveness of video-based learning modules in emergency medicine procedural skill training

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Introduction: Competence in procedural skills is vital within the emergency department. Challenging procedures such as cricothyroidotomy are difficult to master as they are rare and hard to train for. Additionally, common procedures such as chest tube insertions require practice to become sufficiently competent. Opportunities to hone these skills are essential in residency training. This project aimed to create instructional video modules for specific emergency medicine (EM) procedures and gauge their utility as adjunctive resources for procedural learning in the EM residency curriculum. **Methods**: Tutorial videos for clamshell thoracotomy, cricothyroidotomy, and chest tube insertion were filmed within a cadaver lab with step-by-step instructions. The footage was edited and overlaid with a pre-prepared audio narration using Camtasia®/Apple® Video Editing software. These videos were embedded within modules that included foundational knowledge relevant to the procedures, including anatomy, physiology and pathophysiology. The modules were peer-edited by licensed EM staff physicians and distributed to EM residents and staff physicians for analysis. Qualitative and quantitative analysis relied upon participants' answers to questions and a Modified Task Value Scale, respectively. **Results**: Ten participants were included in the analysis, including EM residents (n = 6) and staff emergency physicians (n = 4). Qualitative feedback suggested that positive aspects of the modules included visuals, content, narration, and review of anatomy. Negative aspects included the lack of indications for procedures, technical details, real patient examples, and a speed up function. Quantitative feedback resulted in scores of 4 and above out of 5 on the Motivated Task Value Scale across all aspects for all the modules. Furthermore, analysis revealed an average score of 3.9 for inclination to access more modules such as these, and a score of 4.4 for overall perception of the modules. **Conclusion**: Participants found the video modules valuable to their learning, both qualitatively and quantitatively. This study was limited by a small sample size of modules and a low number of participants. Furthermore, a more detailed analysis with further measures, including self-efficacy and self-confidence, would yield more comprehensive conclusions. However, video-based modules provide an effective and easily accessible adjunctive tool to acquire skill and confidence with EM procedures, for medical learners and staff physicians.
Keywords: procedural skill, video-based learning

P003

Door-to-antibiotics and mortality for emergency department patients presenting with septic shock

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Introduction: We examined our local sepsis patient population, and specifically our most vulnerable patients - those presenting to the emergency department (ED) in septic shock - for variables predictive of survival to hospital discharge. We applied the familiar ED paradigm of, "Door to," to calculate the impact of time to antibiotics against patient survival to hospital discharge. **Methods**: Retrospective chart review of patients aged > = 18 years, presenting to tertiary care ED between 01 Nov 2014 and 31 Oct 2015. Patients determined to have sepsis if A) > = 2 SIRS criteria and ED suspicion of infection (ED acquisition of blood/urine cultures or antibiotic administration) and/or B) received ED or Hospital discharge diagnosis of sepsis (ICD-10 diagnostic codes A4xx and R65). Patients sub-classified with septic shock if A) triage SBP < = 90mmHg, B) triage MAP < = 65mmHg or C) serum lactate > = 4mmol/L. "Door Time" was defined as the earliest time recorded for the patient encounter, either the time the patient registered in the Emergency Department, or the triage time. A generalized linear model was performed with a binomial distribution using survival to discharge as the response variable. Age, sex, ED arrival method, time to antibiotics, ED serum lactate and ED serum glucose level were the predictor variables. **Results**: 13506 patient encounters met inclusion criteria (10980 unique patients). Linear regression of time to antibiotics against survival to hospital discharge failed to achieve statistical significance. Linear regression of the secondary outcome variables achieved statistical significance for age and serum lactate level. Per the model, as age increased by 1 year, the odds of dying prior to hospital discharge increased by 3.8% and as serum lactate increased by 1 mmol/L, odds of dying prior to hospital discharge increased by 11.1%. **Conclusion**: We found no association between time to antibiotic treatment and mortality. Causal relationships require randomized controlled trials, and this analysis contributes to clinical equipoise.

Keywords: antibiotic, emergency department, sepsis

P004

Effect of telephone triage (811) calls on a regional poison centre

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Introduction: Telephone Triage Services (TTS) manage phone calls from the public regarding general medical problems and provide telephone advice. This telephone based care can overlap with care provided by Poison Centres. Our objective was to examine the impact of a provincial 811 TTS on the IWK Regional Poison Centre (RPC). **Methods**: This is a retrospective descriptive study using interrupted time series methodology. We compared monthly IWK RPC call volume in the pre-811 era (January 2007-July 2009) and the post-811 era (September 2009-December 2017). We summarized the characteristics of callers who accessed the IWK RPC in terms of client age, sex, intentionality, time of day, call disposition and outcome. Caller characteristics were compared between the pre- and post-811 eras using chi-square test for categorical variables. We used segmented regression analysis to evaluate changes in slope of call volume in the pre- and post 811 eras. The Durbin-Watson statistic was performed to test for serial correlation and the Dickey-Fuller test to investigate seasonality. **Results**: The dataset included 82683 calls to the IWK RPC – 27028 pre-811 and 55655 post-811. Overall, 55% of calls were for female clients and the largest age group was children aged 0-5 years (37%). Most calls originated from home (47%), followed by a health care facility (23%). Most calls were managed at home (65%). Less than 3% of calls resulted in major effect or death. The Durbin Watson statistic was not statistically significant (p = 0.94). The Dickey-Fuller test indicated series stationarity (p = 0.001). There was no statistically significant change in call volume to the IWK RPC due to the introduction of 811 (p = 0.39). There was no significant variation by time of day, day of week or month, with most calls occurring in the evening. There were significantly more calls regarding intentional ingestions in the post-811 era (23% vs. 19% pre-811, p < .001). Outcomes in the pre and post 811 eras were as follows: minor/no effect/non-toxic/minimal 80% vs. 78%; moderate 7% vs. 10%; and, major/death 1.7% vs. 2.0%. **Conclusion**: The introduction of a TTS did not change call volumes at our RPC. The increase in the percentage of calls about intentional ingestions may reflect an increase in call acuity as the 811-TTS likely manages calls about minor/non-toxic ingestions without consulting with the RPC. Our future research will examine the nature of poison related calls to the 811-TTS.

Keywords: nurse triage, poison centre, telephone triage

P005

An opportunity to reduce morbidity in delayed postpartum hemorrhage: Multicentre analysis of tranexamic utilization in the emergency department

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Introduction: Postpartum hemorrhage (PPH) is a leading cause of maternal mortality and morbidity worldwide. Tranexamic acid (TXA) has been shown to be efficacious and safe in reducing mortality and morbidity if given within 3 hours of bleeding onset. Delayed PPH of more than 24 hours after delivery is a rare but high-risk ED presentation that requires timely management with TXA. This study aims to evaluate the patterns of TXA administration to treat delayed PPH in the ED using a retrospective review of medical reviews from 4 centres across a major urban Canadian city. **Methods**: We conducted a retrospective medical record review of patients presenting with PPH to 4 large urban EDs from 2013 to 2017; from 1.5 million ED visits, using a search for ICD-10 diagnostic codes of interest. Of these, the study cohort included only patients that were admitted to the hospital. Univariate analyses using Chi-squared tests and t-tests for non-continuous and continuous variables, respectively, were used to determine patient demographics and clinical characteristics significantly associated with TXA administration. **Results**: A total of 238 patients were included in the study cohort. Of these patients, 72.7% presented to the ED with mild hypovolemic shock, defined by a shock index score greater than 0.6. A total of 12.6% (95% CI 0.09-0.17) of patients were given TXA for PPH management in the ED. 67% (95% CI 0.47-0.82) of patients received the TXA within 3 hours of triage, whereas 33% (95% CI 0.18-0.53) received it after 3 hours, with the total mean time at 3.43 hours. 4.2% of patients required a blood transfusion and 2.9% required surgery. Univariate analyses indicated that greater maternal age (p = 0.028), lower hemoglobin levels (p = 0.014), higher shock index scores (p = 0.001), greater heart rate (p = < 0.001)), and use of oxytocin (p = <0.001) or blood products (p = < 0.001) in the ED were all significantly associated

with TXA administration. **Conclusion**: The results from this study demonstrate that only 13% of delayed PPH patients presenting to the ED received TXA, and among those treated, 66% received TXA within 3 hours of presentation. The use of TXA was correlated with variables associated with an increased risk of morbidity. Given the rarity of delayed PPH presentation to the ED, the development of a treatment algorithm is recommended to ensure higher levels of timely TXA administration.

Keywords: postpartum hemorrhage, tranexamic acid

P006

Management of first trimester bleeding in the emergency department

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Introduction: Bleeding in the first trimester of pregnancy is a common presentation to the Emergency Department (ED) with half going on to miscarry. Currently there is no local consensus on key quality markers of care for such cases. Point of Care Ultrasound (PoCUS) is increasingly utilized in the ED to detect life threating pathology such as an ectopic pregnancy or fetal viability. PoCUS leads to improved patient satisfaction, quicker diagnosis and treatment. The purpose for this study was to examine the rates of formal ultrasound and PoCUS when compared to reported and recommended rates, and also to understand the use of other diagnostic tests. **Methods**: A retrospective cohort study of pregnant females presenting to the ED with first trimester bleeding over one year (June 2016 – June2017) was completed. A sample size of 108 patients was required to detect a moderate departure from baseline reported rates (67.8 – 77.6%). The primary outcome was the PoCUS rate in the ED. The main secondary outcome was the formal ultrasound rate. The literature recommends PoCUS in all early pregnancy bleeding in the ED, with a target of 100% of patients receiving PoCUS. Additional data recorded included the live birth rate, pelvic and speculum examination rate and lab tests. There is no clearly defined ideal practice for the additional data so these rates will be recorded without comparison. **Results**: Records of 168 patients were screened for inclusion. 65 cases were excluded because they were not pregnant or had confirmed miscarriage or other, leaving a total of 103 patients included in the analysis. The PoCUS rate was 51.5% (95% CI 42%-61%), lower than previously reported PoCUS rates of 73% (67.8 – 77.6%). The formal ultrasound rate was 67% (57%-75%). Both approaches were significantly lower than the recommended rate of 100% (95.7 – 100%). Rates for other key markers of care will also be presented. **Conclusion**: Fewer PoCUS exams were performed at our centre compared with reported and recommended rates for ultrasound. Further results will explore our current practice in the management of first trimester pregnancy complications. We plan to use this information to suggest improvements in the management of this patient population.

Keywords: first trimester bleeding, point of care ultrasound, pregnancy

P007

Development of provincial recommendations for domestic violence screening in emergency departments and urgent care settings in Alberta

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Introduction: Alberta has one of the highest rates of domestic violence (DV) in the country. Emergency departments (EDs) and urgent care centres (UCCs) are significant points of opportunity to screen for DV and intervene. In Alberta, the Calgary Zone began a universal education and direct inquiry program for DV in EDs and UCCs for patients > = 14 years in 2003. The Calgary model is unique in that (a) it provides universal education in addition to screening and (b) screening is truly universal as it includes all age groups and genders. While considering expanding this model provincially, we engaged in the GRADE Adolopment process, to achieve multi-stakeholder consensus on a provincial approach to DV screening, as herewith described. **Methods**: Using GRADE, we synthesized and rated the quality of evidence on DV screening and presented it to an expert panel of stakeholders from the community, EDs, and Alberta Health Services. There was moderate certainty evidence that screening improved DV identification in antenatal clinics, maternal health services and EDs. There was no evidence of harm and low certainty evidence of improvement in patient-important outcomes. As per Adolopment, the expert panel reviewed the evidence in the context of: a) values and preferences b) benefits and harms, and c) acceptability, feasibility, and resource implications. **Results**: The panel came to a unanimous decision to conditionally recommend universal screening, i.e., screening all adults above 14 years of age in EDs and UCCs. By conditional, the panel noted that EDs and UCCs must have support resources in place for patients who screen positive to realize the full benefit of screening and avoid harm. The panel deemed universal screening to be a logistically easier recommendation, compared to training healthcare professionals to screen certain subpopulations or assess for specific symptoms associated with DV. The panel noted that despite absence of evidence that screening would impact patient-important outcomes, there was evidence that effective interventions following a positive screen could positively impact these outcomes. The panel stressed the importance of evidence creation in the context of absence of evidence. **Conclusion**: A GRADE Adolopment process achieved consensus on provincial expansion of an ED-based DV screening program. Moving forward, we plan to gather evidence on patient-important outcomes and understudied subpopulations (i.e. men and the elderly).

Keywords: domestic violence, GRADE adolopment, screening

P008

Evaluation of outcomes after implementation of a provincial prehospital bypass standard for trauma patients – an Eastern Ontario experience

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Introduction: Trauma and injury play a significant role in the population's burden of disease. Limited research exists evaluating the role of trauma bypass protocols. The objective of this study was to assess the impact and effectiveness of a newly introduced prehospital field trauma triage (FTT) standard, allowing paramedics to bypass a closer hospital and directly transport to a trauma centre (TC) provided transport times were within 30 minutes. **Methods**: We conducted a 12-month multi-centred health record review of paramedic call reports and emergency department health records following the implementation of the 4 step FTT standard (step 1: vital signs and level of consciousness, step 2: anatomical injury, step 3: mechanism

and step 4: special considerations) in nine paramedic services across Eastern Ontario. We included adult trauma patients transported as an urgent transport to hospital, that met one of the 4 steps of the FTT standard and would allow for a bypass consideration. We developed and piloted a standardized data collection tool and obtained consensus on all data definitions. The primary outcome was the rate of appropriate triage to a TC, defined as any of the following: injury severity score ≥12, admitted to an intensive care unit, underwent non-orthopedic operation, or death. We report descriptive and univariate analysis where appropriate. **Results**: 570 adult patients were included with the following characteristics: mean age 48.8, male 68.9%, attended by Advanced Care Paramedic 71.8%, mechanisms of injury: MVC 20.2%, falls 29.6%, stab wounds 10.5%, median initial GCS 14, mean initial BP 132, prehospital fluid administered 26.8%, prehospital intubation 3.5%, transported to a TC 74.6%. Of those transported to a TC, 308 (72.5%) had bypassed a closer hospital prior to TC arrival. Of those that bypassed a closer hospital, 136 (44.2%) were determined to be "appropriate triage to TC". Bypassed patients more often met the step 1 or step 2 of the standard (186, 66.9%) compared to the step 3 or step 4 (122, 39.6%). An appropriate triage to TC occurred in 104 (55.9%) patients who had met step 1 or 2 and 32 (26.2%) patients meeting step 3 or 4 of the FTT standard. **Conclusion**: The FTT standard can identify patients who should be bypassed and transported to a TC. However, this is at a cost of potentially burdening the system with poor sensitivity. More work is needed to develop a FTT standard that will assist paramedics in appropriately identifying patients who require a trauma centre.
Keywords: paramedic, trauma bypass, triage

P009

Medical assistance in dying – a survey of Canadian emergency physicians

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Introduction: There have been 3714 medically assisted deaths recorded in Canada so far, with more than half of those deaths occurring outside the hospital – whether this has had any impact on emergency medicine has not yet been documented. This survey sought to find out Canadian emergency physicians' (EPs) attitudes and experiences with medical assistance in dying (MAID). **Methods**: An electronic survey was distributed to CAEP members using a modified Dillman technique. The primary outcome was defined as the proportion of EPs in favour of MAID. Secondary outcomes included experience with suicide in the setting of terminal illness, their experience and opinion on referring patients for MAID from the ED, their experience with complications of MAID, and their response to hypothetical cases of complications from MAID. Nominal variables were analyzed and reported as percentages for each relevant answer. Answers submitted as free-form text were coded into themes by the author and reported based on these themes. **Results**: There were 303 completed surveys. EPs were largely in support of MAID (80.5%), and would be willing to refer patients for assessment from the ED (83.2%), however fewer (58.3%) knew how to do so. 37.1% of EPs had been asked for a referral for MAID assessment, but only 12.5% had made a referral. While only 1% of EPs reported having seen patients present with complications from MAID (failed IVs in the community), 5.0% had seen patients present with suicide or self-harm attempts after being told they were ineligible for MAID by another provider. **Conclusion**: This is the first study to examine the impact of MAID on emergency medicine in Canada, and it demonstrates that patients are both requesting referrals through the ED and, in rare cases, requiring medical attention for complications. This has implications for both increasing awareness of MAID referral processes for EPs, as well as for the prevention and treatment of complications of MAID in the community.
Keywords: assisted dying, medical assistance in dying

P010

Emergency department performed renal point-of-care ultrasound (POCUS) for the assessment of obstructive uropathy: Impact of a training curriculum and ongoing educational intervention

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Introduction: Hydronephrosis is the de facto measure of obstructive uropathy (OU) and can be evaluated using renal Point of Care Ultrasound (rPOCUS). This educational initiative aimed to develop an effective one-day rPOCUS curriculum and evaluate if feedback/quality assurance (QA), leads to an improvement in image acquisition and interpretation of hydronephrosis as well as comfort with the technique. **Methods**: Physicians were randomized into a QA or control group (NQA) and all attended a one day training session which involved acquiring rPOCUS scans with one-on-one instruction. Participants then performed POCUS scans on all ED patients where formal renal US was deemed clinically indicated. The QA group received feedback on every scan from qualified ED physicians. Overall sensitivity and specificity were calculated compared to formal scans using a chi-square test. Written QA was reviewed for future improvements. Crossover occurred at 10 weeks to allow for equal learning opportunity but analyses focused on pre-crossover data. Participants completed surveys at study start and end focusing on initiative effectiveness and barriers/comfort with POCUS measured with a likert scale (Not at all (1)-Very (7)). **Results**: Fourteen ED physicians participated. The most common cited barrier to utilizing rPOCUS was lack of knowledge/training (78.6%). A total of 63 POCUS scans were reviewed. Common feedback included breath-holding (69.7%), use of color doppler (48.5%) and including a transverse sweep (36.4%). Sensitivity and specificity were better in the QA versus NQA group though the difference was not significant (Se- 75.0% vs 50.0%, 95%CI: −34.0-73.4%; Sp- 89.3% vs 73.9%, 95% CI: 8.2-39.2%). Ten physicians completed the post survey; all reported improved comfort with rPOCUS in assessment of hydronephrosis (median [IQR]: Δ+2 [1-3]). At study end, the comfort rating for using only POCUS and not formal scan remained low (median [IQR]: 3.50 [1.8-4.2]). The training initiative was rated highly with a median [IQR] rating of 5.50 [4.8-7.0]. **Conclusion**: Although the initiative was rated highly effective and resulted in improved comfort with renal POCUS, physicians did not feel comfortable solely using POCUS without formal scan to diagnose OU. Despite the initiative's success, further educational programs are needed before rPOCUS can be safely used as the primary investigation. In the future, a greater emphasis should be placed on the commonly noted areas of improvement.
Keywords: obstructive uropathy, point of care ultrasound

P011

A pre-clerkship procedural curriculum designed for the future of Canadian medical education: a pilot and feasibility study

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Introduction: Procedural skills training varies significantly across Canadian medical schools, and there is currently no standardized assessment tool to evaluate its benefits. This project aims to develop a curriculum that teaches 2nd-year medical students to perform and evaluate procedural skills. The goals of this program include decreasing anxiety, increasing confidence, and achieving competence for students and also allowing staff to judge the appropriate level of supervision when delegating learners to perform basic procedures in the team setting. Our curriculum incorporates, near-peer teaching as well as near peer formative assessment. **Methods**: Each of the twelve 2nd year participants completed a State Trait Anxiety Inventory and self-reported confidence questionnaire related to procedural skills. Students participated in four sessions taught by expert physicians over a five month period. A new skill was taught at each monthly workshop and an opportunity to practice previously taught skills was provided. Skills were assessed in a skills integration simulation OSCE, and the anxiety and confidence questionnaire was repeated. **Results**: Students who completed this pilot program showed a significant decrease in mean anxiety state (2.48 vs 1.74, p-value <0.001), while the control group did not (p-value = 0.408). When assessing confidence, students who completed this program showed increased self-assessed knowledge and confidence in each of the program's assessed skills. An increased level of competency was achieved in each skill by each student as assessed by the expert physicians. **Conclusion**: There is evidence to suggest that implementation of this procedural skills training model within the Canadian medical school curriculum may improve student anxiety, confidence, and competency for success in clerkship and could be the foundation for developing milestones for EPAs.

Keywords: pre-clerkship, procedural curriculum, simulation

P012

Mortality rate of cancer patients by type presenting to the intensive care unit with sepsis.

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Introduction: Sepsis in cancer patients is associated with higher mortality rates than non-cancer patients. As a whole, hematological or solid tumor cancers have not demonstrated a prognostic link to sepsis survival rates in intensive care units (ICU), however poor-prognosis solid tumours (less than 25% 5-year survival) have not been investigated. This study examined ICU mortality rate and its predictive factors of patients with sepsis and poor-prognosis solid tumors in comparison to patients with higher prognosis solid tumours. **Methods**: A 6-year retrospective chart review of 79 patients with sepsis and solid tumour cancers and/or metastatic cancers admitted to the ICU was conducted. Information regarding mortality rate within 14 days, length of ICU stay, incidence of intubation, and other primary reasons for ICU admission was collected. Data was analysed using logistic regression. **Results**: Logistic regression results showed intubation as the only significant factor contributing to patient mortality ($p < .001$), with the odds of mortality being 12.3 times higher for intubated than non-intubated patients. Five-year cancer survival rate was the second best predictor ($p = .082$), while age, sex, and metastasis were also not significant predictive factors for survival. Intubated patients with poor prognosis cancers had the lowest survival chance as further indicated by the 16 patients who met this criterion, of which 14 died within two weeks of ICU admission. **Conclusion**: The fact that poor prognosis cancers in sepsis were not significantly predictive of ICU mortality supports current literature regarding solid tumors in general, while intubation being a significant predictor for mortality in patients with sepsis and cancer regardless of type builds on previous research. A limitation of this study is the relative low number of included cases with poor-prognosis cancer types. Further evaluation is needed to understand the implications of our results for end-of-life care and ICU admission for patients with these characteristics.

Keywords: cancer, intensive care, sepsis

P013

A new efficient and accurate scanning protocol for traumatic pneumothorax

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Introduction: According to the International Evidence-Based Recommendations for Point-of-Care Lung Ultrasound published in 2012, the sonographic technique for evaluating a patient for a pneumothorax (PTX) "consists of exploration of the least gravitationally dependent areas progressing more laterally" in the supine patient. However, there is a wide variety of scanning protocols in the literature with varying accuracy and complexity. We sought to derive an efficient and accurate scanning protocol for diagnosing pneumothorax using point of care ultrasound in trauma. **Methods**: We performed a retrospective chart review of a tertiary care trauma registry from Nov 2006 to Aug 2016. We included patients with a PTX diagnosed on computed tomography (CT). Patients were excluded if they did not have an identifiable PTX on the CT scan or if they underwent a tube thoracostomy prior to the CT scan. Penetrating and blunt trauma were eligible. Data were extracted with a standardized data collection tool and 20% of charts reviewed by two reviewers. Pre defined zones were used to map area of PTXs on CT. Sensitivity, specificity and 95% CI are reported for presence of PTXs in each individual or combination of lung zones as identified on CT scan. **Results**: Data were collection yielded 170 traumatic PTX on chest CT with an average age of 44.2 and 77.8% male. The kappa for data extraction was 0.88. 19.4% of patients had bilateral PTX leading to a total sample size of 203. The average ISS score was 20.7 and 93% of patients survived to discharge. The length of ICU stay and hospital stay was 3.7 and 11.2 days respectively. The most accurate and efficient protocol would involve scanning the inferior border of the clavicle at the para-sternal border and again at the mid-clavicular line down to the cardiac (left hemithorax) and liver lung points (right hemithorax). The sensitivity of this scanning area in the detection of PTXs was 91.6% (95% CI 86.9-95%,). Limiting the area to the most anterior point of the chest wall increased the risk of missing a PTX (Sensitivity 89.7% (95%CI 84.6-93.5)). **Conclusion**: We have derived an evidence-based standardized accurate and efficient scanning protocol to rule out a pneumothorax on point of care ultrasound.

Keywords: pneumothorax, point of care ultrasound, trauma

P014

Does a positive Dix-Hallpike rule out a central cause of vertigo?

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Introduction: Dizziness is a common presentation in emergency departments (ED), accounting for 2-3% of all visits. The majority are due to benign causes the most common of which is benign paroxysmal positional vertigo (BPPV). The Dix-Hallpike maneuver is used to diagnose BPPV with an affected posterior semicircular canal. A positive Dix-Hallpike exam should lead physicians to exclude central causes for a patient's symptoms and confirm no need for further imaging. The purpose of our study was to verify the accuracy of the Dix-Hallpike maneuver for ruling out a central cause of dizziness. **Methods**: We performed a medical records review of adult patients with dizziness/vertigo presenting to a tertiary care ED (September 2014 and March 2018). We included those with a suspicion for BPPV and underwent a Dix-Hallpike maneuver. We excluded patients who presented with dizziness for longer than two weeks, syncope, systolic hypotension <90 or a GCS <15. Individual patient data were linked with the Institute of Clinical Evaluation Science (ICES) database. Our outcome was a central cause defined as: ischemic stroke (IS), brain tumour, intra cerebral haemorrhage (ICH), or multiple sclerosis (MS) diagnosed on either neurology assessment, computed tomography, magnetic resonance imaging, or diagnostic codes related to central causes found within ICES. **Results**: 3109 patients were identified of these 469 patients underwent a Dix-Hallpike manoeuvre. Central causes of dizziness accounted for 1.1% of all diagnoses. Probability of a central cause for dizziness in those with a positive Dix-Hallpike was 1.3%(3/229). Only 85(18.1%) patients were appropriate for the Dix-Hallpike(intermittent, position-evoked vertigo without any neurological deficits). In appropriate patients the prevalence of central cause of dizziness was 3%(1/31). This patient had > 3 risk factors for stroke (age > 65, hypertension, diabetes, ischemic heart disease). A positive Dix-Hallpike in appropriate patients with <3 risk factors for stroke was 100% (95%CI 88.8% -100%) sensitive in ruling out a central cause for dizziness. **Conclusion**: The Dix-Hallpike manoeuvre is performed on a large number of inappropriate patients. When performed on appropriate patients with <3 risk factors for stroke a positive Dix-Hallpike can rule out a central cause of vertigo. Educating physicians as to the appropriate patient population could reduce unnecessary imaging and improve diagnostic accuracy.

Keywords: clinical examination, Dix Hallpike, vertigo

P015

A phase IV protocol for a real world study on the use of low dose methoxyflurane (PENTHROX™) for the treatment of moderate to severe trauma pain in the Canadian emergency department (ADVANCE-ED)

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Introduction: Pain is a significant driver of demand in emergency care and 65% of adult patients with trauma also report moderate to severe pain. Inhaled low dose methoxyflurane (MEOF) a rapid-acting patient administered inhalational analgesic was recently approved in Canada for the short-term relief of moderate to severe acute pain associated with trauma or interventional medical procedures in conscious adult patients. This study will generate real-world evidence to complement the global clinical development program through evaluation of the effectiveness of MEOF in Canadian emergency departments. **Methods**: This is a phase IV, prospective open label, multi-centre study. Approximately 100 adult (≥18 yrs) patients with moderate to severe acute pain (NRS0-10≥4) associated with single system trauma will be enrolled at 5-10 EDs across Canada. Patients will receive a single treatment of up to 2 x 3 mL MEOF (2nd 3 mL to be provided only upon request), self-administered by the patient under medical supervision. Rescue medication will be permitted at any time, if required. **Results**: Planned Assessments and Outcome **Measures**: Pain will be assessed using the NRS0-10 at 4 time points: screening/triage, 5 minutes and 20 minutes post-start of administration (STA) of MEOF, and when ready for discharge. Secondary assessments will include the speed of action of analgesia (from STA of MEOF); patient and physician satisfaction with treatment (as assessed through Global Medical Performance (GMP) at 20 minutes post-STA and when ready for discharge); patient and physician fulfilment of pain relief expectations (assessed when ready for discharge); use of rescue medication and treatment-emergent adverse events. Exploratory outcomes will include the time to disposition, time to readiness for discharge and responder analysis. The primary outcome measure will be the change in pain intensity over 20 minutes from the start of administration of MEOF as measured on the NRS0-10. **Conclusion**: We report on the methodology of a phase IV, prospective open label, multi-centre study, evaluating the use of MEOF for the management of acute traumatic pain in Canadian Emergency Departments.

Keywords: low-dose methoxyflurane, real-world evidence, trauma

P016

Utilization and outcomes of children presenting to an emergency department by ambulance

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Introduction: Children account for a low proportion of paramedic transports. Evidence suggests that many pediatric transports are of low acuity, but there are few studies comparing these patients to those that self-present to the ED. Our primary objective was to determine if illness severity was associated with presentation by ambulance among pediatric patients. **Methods**: We undertook a single centre, retrospective cohort study at a tertiary care pediatric centre. All patients presenting to the ED in 2015 by any route other than air ambulance were eligible. Patients were divided into 2 groups based on the route of presentation – ambulance or self-presentation. The primary outcome was disposition decision; the secondary outcome was CTAS level. To determine whether patient discharge disposition or CTAS was associated with method of arrival, we conducted generalized estimating equations (GEE) to account for correlation within patients with multiple ED visits. **Results**: Of the 69,092 visits, 69,034 were eligible and analyzed. Of those, 4478 arrived by ambulance, while 64,556 self-presented. Those arriving by ambulance had a median age of 10 years [IQR: 2-5 years] vs. 4 years [IQR: 1.75-10 years] in the self-presenting group, and were 52.6% male (vs. 52.8%). Two percent of the ambulance cohort were admitted to the ICU (vs. 0.2%), and 16.6% were admitted to the ward (vs. 5%). Patients presenting by ambulance had higher CTAS scores – 5.3% CTAS 1 (vs. 0.3%), 16.4% CTAS 2 (vs. 7.0%), 61.2% CTAS 3 (vs. 45.8%), and 17.1% CTAS 4-5 (vs. 46.9%). The odds of arriving by

ambulance were 10.2 x higher for patients admitted to the ICU (OR = 10.2, 95%CI: 7.9 to 13.3) vs. those discharged home. The odds of arriving by ambulance was 64.2 x (OR = 64.2, 95% CI: 48.6 to 84.7) higher for patients CTAS 1 patients vs. CTAS 5 patients. The top 3 complaints among ambulance patients were respiratory (22.7%), orthopedic (14.7%), and general/minor (10.3%). Among self-presenting patients, the top three were general/minor (22.5%), respiratory (18.0%), and gastrointestinal (15.7%). **Conclusion**: Children presenting to the ED via ambulance are at higher risk for admission to the ward and critical care unit. It is important that EMS staff responsible for transporting children be well trained in managing critically ill children. Given the low proportion of pediatric transports, consideration must be given to how best to train EMS services in managing these children.

Keywords: emergency medical services, paediatrics, prehospital

P017

Impact of the use of a checklist for transcutaneous cardiac pacing on competency of junior residents undergoing an advanced cardiac life support course

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Introduction: Transcutaneous cardiac pacing (TCP) is recommended for the treatment of symptomatic bradycardia, a life-threatening condition. Although TCP is taught in ACLS (advanced cardiac life support) courses, it is a difficult skill to master for junior residents. The main objective of this study is to measure the impact of having access to a checklist on successful TCP implementation. Our hypothesis was that the availability of a CL would improve performance of junior residents in the management of symptomatic bradycardia by facilitating TCP. **Methods**: We conducted a prospective, randomized, single-site study. First-year residents entering postgraduate programs and taking a mandatory ACLS course were enrolled. Students had didactic sessions on the management of symptomatic bradycardia followed by hands-on teaching on a low-fidelity manikin (ALS® simulator, Laerdal) using a CL conceived for this project as a teaching tool. Study participants were then assessed with a simulation scenario requiring TCP. Participants were randomly assigned to groups with and without CL accessibility. Performances were graded on six critical tasks. The primary outcome was the successful use of TCP, defined as having completed all tasks. Participants then completed a post-test questionnaire. Sample size estimation was based on a previous project (Ranger et al., 2018). Accepting an alpha error of 0.05 and a power of 80%, 45 participants in each group would permit the detection of 26.5% in performance gain. **Results**: Of 250 residents completing the ACLS course in 2017, 85 voluntary participants were randomized to a control group (no CL available during testing, n = 42) or an experimental group (CL available during testing, n = 43). Six participants in the experimental group adequately used TCP compared to five participants in the control group (p = 0.81, chi-squared test). Out of the 43 participants who had access to the CL, only 2 (5%) used it. Reasons why the CL was infrequently used were stated as the following: 24 participants (56%) mentioned not realizing it was available, 8 (19%) considered it was of little to no utility and 5 (19%) forgot a CL existed. **Conclusion**: Availability of a checklist previously used during simulation teaching did not increase junior residents' capacity to correctly apply TCP. Non-recognition of CL availability and decreased perceived need for it were the main reasons for marginal use. Our results suggest that there are many limiting factors to CL effectiveness.

Keywords: bradycardia, checklist, simulation

P018

How to get your departmental web content to work for you: one department's experience with free open access medical education

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Innovation Concept: Free open access medical education (FOAM) is a quickly growing field. While there is an abundance of resources online, and on social media, the quality of those resources should always be questioned and reviewed. Furthermore, as medical learners progress in their training, they become lead consumers and producers of FOAM. Our educational innovation concept was the introduction of two FOAM streams into our residency program to assist learners to produce their own content with mentorship from our emergency medicine faculty. **Methods**: Medical students and residents training in the emergency department were encouraged to submit content to either our department website in the form of a clinical PEARL, or a research paper to the departmental Cureus online journal. All website content was reviewed by an attending physician and all Cureus content was submitted for further peer review and publication if approved. All published content was shared on social media through our department's Twitter account. A select number of residents were also mentored in reviewing and editing FOAM content and publishing it to our departmental website. **Curriculum, Tool or Material**: sjrhem.ca is the Saint John Regional Hospital Department of Emergency Medicine's website. A portion of the website is dedicated to posts arising from departmental rounds, case reviews as well as posts from learners in the form of clinical PEARLS. They are designed as succinct and informative clinical summaries and allow learners to share their content to a wider audience online. Cureus.com is an online journal of medical science, with a dedicated Dalhousie Emergency Medicine Channel. The editors are local emergency medicine faculty and senior residents, while reviewers are independent. In the last year, the clinical pearls received 5672 views, and the Cureus channel received 1143 content views. **Conclusion**: Feedback from learners regarding publication of their own FOAM has been positive and has allowed them to share their content to a much wider audience through our Departmental Website, Cureus Channel and Twitter stream. Furthermore, we are helping to prepare residents to produce their own high quality content, allowing our FOAM program to grow.

Keywords: free open access medical education (FOAM), innovations in EM education

P019

Examining non-suicidal self injury at a Canadian pediatric emergency department

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Introduction: Adolescents who present to emergency departments (ED) following intentional injuries present a challenge in terms of ascertaining their intent and risk for future self-injurious or suicidal behaviour. Our ED has seen an 80% increase in visits for mental

health issues over the past ten years. As usage of our Emergency Mental Health and Addictions Services (EMHAS) team continues to rise, it is increasingly important to understand the incidence of NSSI among our youth, explore if NSSI is reported at triage and identify characteristics that may distinguish these adolescents from others presenting for mental health assessment. **Methods**: This is an exploratory research study using retrospective data. Patients who had an Emergency Mental Health Triage (EMHT) form on their health record from an ED visit between June 1, 2017 and May 31, 2018 were eligible. Trained research assistants, using a structured data collection form in REDCap. abstracted data from the EMHT form, the EMHAS Assessment form, the Assessment of Suicide Risk Inventory and our CHIRPP (Canadian Hospitals Injury Reporting and Prevention Program) database. We calculated kappa values and 95% confidence intervals to describe the extent to which the forms agree with respect to identifying NSSI. We will compare the cohort who reports NSSI with the cohort who does not report NSSI using chi-square statistics depending. We will use descriptive statistics to characterize the NSSI patients. **Results**: During the one-year study period 955 patients had an EMHT form completed. In preliminary analysis 558 (58.4%) reported a history of NSSI. Patients reported NSSI on both the EMHT form and the EMHAS assessment form 64.7% of the time (kappa 0.56) indicating moderate agreement. In patients with NSSI, 9.5% of patients reported it only at triage and 25.8% of patients reported it only during their EMHAS assessment. Between group comparisons and descriptive analysis is underway. **Conclusion**: More than half of youth triaged with an emergency mental health complaint in our ED reported a history of NSSI. Screening at triage was moderately effective in identifying adolescents with NSSI compared to an in-depth assessment by the mental health team. Further research is needed to clarify how NSSI relates to risk for suicide.
Keywords: non-suicidal self injury

P020

Impact of dexamethasone dose on return visits at a tertiary pediatric emergency department

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Introduction: Croup is a common viral upper airway infection in children aged 6 months to 6 years. Although a single dose of dexamethasone decreases return visits, the prescribed dose varies from 0.15mg/kg to 0.6mg/kg. Our objective was to examine the effect of varied dexamethasone dosing on unplanned return ED visits for croup. **Methods**: This was a retrospective chart review of IWK ED patient treatment records from September 1, 2014 – August 31, 2016 of children aged 6 months to 6 years with an ICD-10 discharge diagnosis code of croup. Data were abstracted by trained research assistants using a structured data collection form in REDCap. A sample of 5% of charts had double data abstraction to test for agreement. Our primary outcome was return visits to the ED within 7 days. Secondary outcomes were ED length of stay (LOS), admission to hospital and admission to the pediatric intensive care unit (PICU). Data were analyzed using descriptive statistics and chi-square for between group comparisons. **Results**: The dataset included 1595 patient visits for croup. Data analysis is in progress. Triage acuity as per CTAS included: resuscitation n = 5; emergent n = 351; urgent n = 558; less urgent n = 605; and, non-urgent n = 2. Most patients had no co-morbid conditions (n = 1548). Dexamethasone dosing varied: 0.15 mg/kg n = 64; 0.3 mg/kg n = 838; and, 0.6 mg/kg n = 493. ED LOS was under 1 hour in 483 patients, 1-3 hours in 805, 3-6 hours in 225 and 6-12 hours in 9 patients. Few patients were admitted to hospital (n = 22) and no patients were admitted to PICU. Within 7 days of the index visit, 78 patients had an unplanned return visit to the ED for croup. **Conclusion**: The data analysis is in progress. This study will inform our future research on a practice change in our ED to comply with the dose of dexamethasone recommended by the Canadian Pediatric Society for the treatment of croup in 2017.
Keywords: croup, return visits, steroid

P021

Interventions to reduce emergency department door-to-ECG times: a systematic review

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Introduction: We wished to identify emergency department interventions that lead to improvement in door-to-ECG times for adults presenting with symptoms suggestive of acute coronary syndrome (ACS). **Methods**: Two reviewers searched Medline, Embase, CINAHL and Cochrane CENTRAL from inception to April 2018 for studies in adult emergency departments with an identifiable intervention to reduce median door-to-ECG times when compared to the institution's baseline. Quality was assessed using the 'Quality Improvement Minimum Quality Criteria Set' (QI-MQCS) critical appraisal tool. The primary outcome was the absolute median reduction in door-to-ECG times as calculated by the difference between the post-intervention time and pre-intervention time. **Results**: Two reviewers identified 809 unique articles, yielding 11 before-after quality improvement studies that met eligibility criteria (N = 15,622 patients). The majority of studies (10/11) reported bundled interventions and most (10/11) showed statistical improvement in door-to-ECG times. The most common interventions were: having a dedicated ECG machine and technician in triage (5/11); improved triage education (4/11); improved triage disposition (2/11); and data feedback mechanisms (1/11). **Conclusion**: There are multiple interventions that show promise for reducing emergency department door-to-ECG times. Effective bundled interventions include having a dedicated ECG technician, triage education and better triage disposition. These changes, bundled together, can help intuitions attain best practice guidelines. Emergency departments must first understand their local context before adopting any single or group of interventions.
Keywords: door-to-ECG, quality improvement

P022

A multimodal evaluation of an emergency department (ED) electronic tracking board utility designed to improve throughput by optimizing stretcher utilization

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Introduction: Access block is a pervasive problem, even during times of minimal boarding in the ED, suggesting suboptimal use of ED stretchers can contribute. A tracking board utility was embedded into the electronic health record in Calgary, AB, allowing MDs and RNs to consider patients who could be relocated from a stretcher to

a chair. Objectives of this study were to evaluate the feature's impact on total stretcher time (TST) and ED length of stay (LOS) for patients relocated to a chair. We also sought to identify facilitators and barriers to the tool's use amongst ED MDs and RNs. **Methods**: A retrospective cohort design was used to compare TST between those where the tool was used and not used amongst patients relocated to a chair between September 1 2017 and August 15 2018. Each use of the location tool was time-stamped in an administrative database. Median TST and ED LOS were compared between patients where the tool was used and not used using a Mann-Whitney U Test. A cross sectional convenience sample survey was used to determine facilitators and barriers to the tool's use amongst ED staff. Response proportions were used to report Likert scale questions; thematic analysis was used to code themes. **Results**: 194882 patients met inclusion criteria. The tool was used 4301 times, with "Ok for Chairs" selected 3914(2%) times and "Not Ok for Chairs" selected 384(0.2%) times; 54462 (30%) patients were moved to a chair without the tool's use. Mean age, sex, mode of arrival and triage scores were similar between both groups. Median (IQR) TST amongst patients moved to a chair via the prompt was shorter than when the prompt was not used [142.7 (100.5) mins vs 152.3 (112.3) mins, $p < 0.001$], resulting in 37574 mins of saved stretcher time. LOS was similar between both groups ($p = 0.22$). 125 questionnaires were completed by 90 ED nurses and 35 ED MDs. 95% of staff were aware of the tool and 70% agreed/strongly agreed the tool could improve ED flow; however, 38% reported only "sometimes" using the tool. MDs reported the most common barrier was forgetting to use the tool and lack of perceived action in relocating patients. Commonly reported nursing barriers were lack of chair space and increased workload. **Conclusion**: Despite minimal use of the tracking board utility, triggering was associated with reduced TST amongst ED patients eventually relocated to a chair. To encourage increased use, future versions should prompt staff to select a location.

Keywords: electronic health records, overcrowding

P023

The BC Emergency Medicine Network: Evaluation approach and early findings

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Introduction: September 2017 saw the launch of the British Columbia (BC) Emergency Medicine Network (EM Network), an innovative clinical network established to improve emergency care across the province. The intent of the EM Network is to support the delivery of evidence-informed, patient-centered care in all 108 Emergency Departments and Diagnostic & Treatment Centres in BC. After one year, the Network undertook a formative evaluation to guide its growth. Our objective is to describe the evaluation approach and early findings. **Methods**: The EM Network was evaluated on three levels: member demographics, online engagement and member perceptions of value and progress. For member demographics and online engagement, data were captured from member registration information on the Network's website, Google Analytics and Twitter Analytics. Membership feedback was sought through an online survey using a social network analysis tool, PARTNER (Program to Analyze, Record, and Track Networks to Enhance Relationships), and semi-structured individual interviews. This framework was developed based on literature recommendations in collaboration with Network members, including patient representatives. **Results**: There are currently 622 EM Network members from an eligible denominator of approximately 1400 physicians (44%). Seventy-three percent of the Emergency Departments and Diagnostic and Treatment Centres in BC currently have Network members, and since launch, the EM Network website has been accessed by 11,154 unique IP addresses. Online discussion forum use is low but growing, and Twitter following is high. There are currently 550 Twitter followers and an average of 27 'mentions' of the Network by Twitter users per month. Member feedback through the survey and individual interviews indicates that the Network is respected and credible, but many remain unaware of its purpose and offerings. **Conclusion**: Our findings underscore that early evaluation is useful to identify development needs, and for the Network this includes increasing awareness and online dialogue. However, our results must be interpreted cautiously in such a young Network, and thus, we intend to re-evaluate regularly. Specific action recommendations from this baseline evaluation include: increasing face-to-face visits of targeted communities; maintaining or accelerating communication strategies to increase engagement; and providing new techniques that encourage member contributions in order to grow and improve content.

Keywords: evaluation, network, quality improvement and patient safety

P024

Obtaining consensus on optimal management and follow-up of patients presenting to the emergency department with early pregnancy complications – a modified Delphi study

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Introduction: Complications in early pregnancy are common and have many physical and emotional consequences. Locally, there is no early pregnancy loss clinic or standardized guide in the emergency department (ED) for referral and follow-up decisions, and both initial management of patients and follow up can be inconsistent. This study aimed to obtain consensus on the best approach to initial work-up, management, and follow up for patients who present to the ED with early pregnancy complications, with the goal of using this consensus to produce a standardized guide for emergency provider use. **Methods**: A literature review was completed to produce evidence-based recommendations which were used to initiate a modified Delphi consensus process. A survey was distributed, with three rounds completed. Participants included emergency providers, obstetrician-gynecologists, a radiologist, a sample of family medicine physicians including some involved in primary care obstetrics, and nurse practitioners. An obstetric specialist from outside the local region was also involved. **Results**: Consensus was reached on several key recommendations, however some areas remained without clear accepted best practice. There was consensus that physical components of early pregnancy complications are addressed well, but that we could improve on patient flow and more consistent follow up. Important investigations to be done for patients were identified. The timing of formal ultrasound, necessity and timing of obstetrician consultation, and safety of discharge was addressed for various patient scenarios including stable and unstable patients, with and without adnexal pain, with

intrauterine pregnancy of uncertain viability, and with pregnancy of unknown location. Management of confirmed early pregnancy loss in the ED and family medicine clinics was addressed. Barriers to an early pregnancy loss clinic included lack of funding, space, and staffing as well as lack of resources and uncertain patient volumes. A feasible alternative to an early pregnancy loss clinic was for willing providers to keep appointment times available to facilitate confirmation of follow-up prior to discharge. Other suggested alternatives included an early pregnancy loss clinic, a nurse educator, and having a standardized guideline in the ED. **Conclusion**: Through a consensus approach, several recommendations were agreed upon for improving care for patients presenting to the ED with early pregnancy complications.

Keywords: complications, emergency department, pregnancy

P025

Improving senior resident engagement at academic core rounds

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Introduction: Royal College Emergency Medicine (EM) trainees at the University of Ottawa participate in weekly Academic Full Days (AFD) that consist of didactic activities, simulation-based learning, and core content sessions referred to as Core Rounds (CR). Despite CR being intentioned for all EM trainees, an attendance attrition has been noted as trainees progress towards their senior (SR) years (PGY3-5). The objectives of this study were to (1) identify barriers to SR trainee CR attendance and (2) identify areas for CR improvement. **Methods**: An on-line survey was administered to SR EM trainees (PGY3-5, n = 28) and recent graduates from our program (practice year 1-2, n = 20) to explore perceptions of the value of AFDs, CR attendance barriers, and areas for CR improvement. The survey consisted of 5-point Likert scales and free-text responses. Quantitative responses were analyzed using Microsoft Excel. Free-text responses were analyzed qualitatively using thematic analysis. Each free-text response was reviewed independently by two investigators (JML, MCL) and underwent line-by-line coding. Through joint discussions, the codes from each response were synthesized and themes were identified. **Results**: Of the 48 trainees and attendings surveyed, 32 responded (response rate 67%). Most respondents (90%) stated they benefited from SR trainee attendance when they were at a junior (JR) level. The majority perceived they benefited less from CR as a SR trainee compared to when they were a JR trainee (85%). Further, 87% responded that CR were not tailored to a SR level, and that they would attend more frequently if sessions were geared to their level (81%). From our thematic analysis, three themes emerged relating to SR trainee absenteeism: 1) CR quality, 2) External Factors (eg. trainee fatigue) and 3) Malalignment with trainees' own education plan. We also identified three themes relating to areas for CR improvement: 1) CR content, 2) CR format and 3) SR trainee involvement. **Conclusion**: Respondents indicated a benefit to having SR trainee presence at CR. This study identified barriers to SR resident attendance at CR and areas for improvement. With the transition to competency based medical education it is critical that trainees engage in effective educational experiences, especially as the RCPSC does not mandate AFDs for EM training in this new curriculum. A culture-change initiative and CR reformat is now underway at our institution with planned post-implementation analysis.

Keywords: attendance, engagement, rounds

P026

Dominating the vent: A flipped classroom approach to enhance emergency medicine resident ventilator management

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Innovation Concept: Ventilator management is an essential skill and a training objective for emergency medicine (EM) specialists in Canada. EM trainees obtain the majority of this training during off-service rotations. Previous attempts to strengthen ventilator knowledge include lectures and simulation – both of which are time and resource intensive. Given the unique features of ventilator management in the ED, we developed an ED-specific ventilator curriculum. The purpose of this study is to 1) identify resident needs regarding ventilator curricula and 2) assess resident response to this pilot curriculum. **Methods**: A needs-assessment survey administered to RCPSC- and CCFP-EM residents at The Ottawa Hospital (TOH) showed the majority of residents (87%, n = 31 respondents) believe there is a need for more ED-focused ventilator management training, and only 13% felt confident in ventilator management. Ten on-line modules were prepared by an EM-Critical Care attending, and distributed on-line to all EM trainees at TOH (n = 52). Mid- and post-implementation surveys are used to assess residents' confidence in ventilator management, and perceived usefulness of the curriculum. User feedback from focus groups constitutes part of the curriculum evaluation. **Curriculum, Tool or Material**: Employing a flipped classroom approach, ten on-line modules were distributed to RCPSC- and CCFP-EM trainees at TOH. Each module requires less than ten minutes to complete and focuses on a single aspect of ventilation. The modules are available for residents to complete at their own pace and convenience. At curriculum completion, an EM-Critical Care attending physician facilitates an interactive session. **Conclusion**: Mid-implementation survey results demonstrate increased confidence in independently managing ventilated patients in the ED (13% pre- vs. 56% mid-implementation), and an increased perception of having sufficient ventilator training (26% pre- vs. 78% mid-implementation). All respondents felt the modules were of appropriate length, content was easy to follow, and that the modules should be part of the residency curriculum. Our ED-specific online ventilator modules area a viable tool to increase residents' confidence in ventilator management. This novel curriculum could be adopted by other residency programs and continuing professional development initiatives. Future work will include post-implementation data-gathering, and formal curriculum evaluation.

Keywords: flipped-classroom, innovations in EM education, ventilators

P027

Who should discuss goals of care during acute deteriorations in patients with life threatening illnesses? A survey of clinicians from diverse pediatric specialties

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Introduction: Discomfort exists discussing goals of care with families of children with advanced life-threatening illnesses. There also exists important variability in the management of these patients. This study seeks to explore the perceptions of pediatric specialists involved in the care of children with life-threatening illnesses with regards to goals of

care discussions and management during acute unexpected deteriorations. **Methods**: This single center survey study used 4 scenarios of children presenting to the emergency department with respiratory distress. Scenarios included patients with hypoplastic left heart syndrome, static encephalopathy, spinal muscular atrophy and refractory leukemia. Questions following each vignette were identical. Physicians from the specialties most involved in these scenarios completed the survey by email or in person. Data analysis used SPSS v.20 (IBM Inc.). Related samples non-parametric tests compared participants' Likert scale answers. **Results**: Between May 2015 and May 2016, 60 participants completed the study; 14 were excluded (>60% missing answers). Most (80.4%) participants reported an interest in pediatric palliative care; 71.7% had 0-3 formal trainings. Participants believed goals of care were best discussed before an acute deterioration. Acute deteriorations were not seen as an opportune moment to initiate discussions about goals of care. However, validating these previous wishes was necessary, given that not discussing them was judged unacceptable by the participants. Pediatric specialists were seen as the most suitable teams to initiate these discussions, while the emergency department's role in these discussions was unclear. Several management options were less acceptable for the patient with static encephalopathy. **Conclusion**: Discussing goals of care during acute illness exacerbation involves many stakeholders, who may not always be available at critical times. Advanced care planning with these families is essential to prepare them for acute health events.

Keywords: acute deteriorations, goals of care, pediatric palliative care

P028

Quel est le meilleur moment de départ vers le centre hospitalier pour les patients souffrant d'un arrêt cardiaque extrahospitalier potentiellement éligible à une réanimation par circulation extracorporelle?

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Introduction: La réanimation par circulation extracorporelle (R-CEC) permet potentiellement d'améliorer la survie de patients souffrant d'un arrêt cardiaque extrahospitalier (ACEH) réfractaire aux traitements habituels. Cette technique, se pratiquant généralement en centre hospitalier (CH), doit être réalisée le plus précocement possible. Un transport vers le CH en temps opportun est donc nécessaire. Cette étude vise à décrire la durée nécessaire des manœuvres de réanimation préhospitalières afin d'optimiser le moment du départ vers le CH dans le but d'obtenir un maximum de retour de circulation spontanée (RCS) préhospitalier. **Methods**: La présente étude de cohorte a été réalisée à partir des bases de données collectées de la Corporation d'Urgences-santé dans la région de Montréal entre 2010 et 2015. Les patients éligibles à une R-CEC selon les critères locaux ont été inclus (<65 ans, rythme initial défibrillable, arrêt témoigné avec réanimation par un témoin). Les patients ayant eu un arrêt devant les paramédics ont été exclus, tout comme ceux avec un RCS avant l'arrivée des services préhospitaliers. Nous avons calculé la sensibilité et la spécificité à différents seuils afin de prédire un RCS préhospitalier et une survie au congé hospitalier. Une courbe ROC a également été construite. **Results**: Un total de 236 patients (207 hommes et 29 femmes) d'un âge moyen de 52 ans (±10) ont été inclus dans l'étude, parmi lesquels 93 (39%) ont survécu jusqu'à leur congé hospitalier et 136 (58%) ont obtenu un RCS préhospitalier. Le délai moyen avant leur RCS était de 13 minutes (±10). Plus de 50% des survivants avaient eu un RCS moins de 8 minutes après l'initiation des manœuvres de réanimation par les intervenants préhospitaliers, et plus de 90% avant 24 minutes. Plus de 50% de tous les RCS survenaient dans les 10 premières minutes de réanimation et plus de 90% dans les 31 premières minutes. La courbe ROC montrait visuellement que le délai avant le RCS maximisant la sensibilité et la spécificité pour prédire la survie chez ces patients était à 22 minutes (Sensibilité = 90%, spécificité = 78%; aire sous la courbe = 0,89 [intervalle de confiance à 95% 0,84-0,93]). **Conclusion**: Le départ vers le CH pourrait être considéré pour ces patients entre 8 et 24 minutes après l'initiation des manœuvres. Une période de réanimation de 22 minutes semble être le meilleur compromis à cet égard.

Keywords: extracorporeal resuscitation, out-of-hospital cardiac arrest, prognosis

P029

Are acute pain trajectories after an emergency department visit associated with chronic pain at 3 months?

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Introduction: Studies suggest that acute pain evolution after an emergency department (ED) visit has been associated with the development of chronic pain. Using group-based trajectory modeling (GBTM), we aimed to evaluate if ED discharged patients with similar pain intensity profiles of change over 14 days are associated with chronic pain at 3 months. **Methods**: This is a prospective cohort study of patients aged 18 years or older who visited the ED for an acute pain condition (≤2 weeks) and were discharged with an opioid prescription. Patients completed a 14-day diary in which they listed their daily pain intensity level (0-10 numeric rating scale). Three months post-ED visit, participants were interviewed by phone to report their pain intensity related to the initial pain. **Results**: A total of 305 patients were retained at 3 months (mean age ± SD: 55 ± 15 years, 49% women). Using GBTM, six distinct pain intensity trajectories were identified during the first 14 days of the acute pain period; two linear one with moderate or severe pain during the follow-up (representing almost 40% of the patients) and four cubic polynomial order trajectories, with mild or no-pain at the end of the 14 days (low final pain). Twelve percent (11.9; ±95%CI: 8.2-15.4) of the patients had chronic pain at 3 months. Controlling for age, sex and types of pain condition, patients with trajectories of moderate or severe pain and those with only severe pain were 5.1 (95%CI: 2.2-11.8) and 8.2 (95%CI: 3.4-20.0) times more likely to develop chronic pain at 3 months, respectively, compared to the low final pain group. **Conclusion**: Trajectories could be useful to early identification of patients at risk of chronic pain.

Keywords: chronic pain, trajectory

P030

Acute pain resolution after an emergency department visit: a 14-day trajectory analysis

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Introduction: The objective of the study was to evaluate the acute pain intensity evolution in ED discharged patients using Group-based trajectory modeling (GBTM). This method identified patient groups with similar profiles of change over time without assuming the existence of a particular pattern or number of groups. **Methods**: This was a prospective cohort study of ED patients aged ≥18 years with an acute pain condition (≤ 2 weeks) and discharged with an opioid prescription. Patients completed a 14-day diary assessing daily pain intensity level (0-10 numeric rating scale) and pain medication use. **Results**: Among the 372 included patients, six distinct post-ED pain intensity trajectories were identified: two started with severe levels of pain, one remained with severe pain intensity (12.6% of the sample) and the other ended with moderate pain intensity level (26.3%). Two other trajectories had severe initial pain, one decreased to mild pain (21.7%) and the other to no-pain (13.8%). Another trajectory had moderate initial pain which decreased to a mild level (15.9%) and the last one started with mild pain intensity and had no pain at the end of the 14-day (9.7%). The pain trajectory patterns were significantly associated with age, type of painful conditions, pain intensity at ED discharge, and with opioid consumption. **Conclusion**: Acute pain resolution following an ED visit seems to progress through six different trajectory patterns that are more informative than simple linear models and could be useful to adapt acute pain management in future research.
Keywords: pain, trajectory

P031

Naltrexone initiation for alcohol use disorder in the emergency department: A systematic review

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Introduction: Alcohol use disorder (AUD) is a chronic relapsing and highly comorbid disease. Patients suffering from AUD are frequently seen in the emergency department (ED) presenting intoxicated or in withdrawal. Brief interactions in the ED are often the only portal of entry to the healthcare system for many of these patients. Oral naltrexone and long acting injectable naltrexone are effective treatment options for AUD associated with decreased cravings, shorter length of hospital stay, and lower cost of healthcare utilization. This study's objective was to perform a systematic review of the literature evaluating initiation of naltrexone in the ED. **Methods**: Electronic searches of Medline, EMBASE, Cochrane Central Register of Controlled Trials, Cochrane Database of Systematic Reviews and CINAHL were conducted and reference lists were hand-searched. Randomized controlled trials (RCTs) comparing initiation of naltrexone in patients (≥18 years) to standard care in the ED were included. Two reviewers independently screened titles and abstracts, reviewed full text articles for inclusion, assessed quality of the studies, and extracted data. **Results**: The search strategy yielded 183 potentially relevant citations. After eliminating duplicate citations and studies that did not meet eligibility criteria, 10 articles were retrieved for full text review. There were no published RCTs that examined naltrexone initiation in the ED. There is one ongoing study being conducted in New York, which aims to assess naltrexone initiation in the ED and measure health outcomes and quality of life of study participants, as well as potential healthcare cost savings. **Conclusion**: The lack of published research in this area demonstrates a significant gap in knowledge. It is clear that well-designed RCTs are needed to evaluate the effectiveness of initiating naltrexone for those with AUD at the ED visit.
Keywords: alcohol use disorder, emergency department, naltrexone

P032

Video-based learning modules as an adjunct for teaching emergency medicine procedural skills

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Innovation Concept: Competence in procedural skills is vital within the emergency department. Challenging procedures such as cricothyroidotomy are difficult to master as they are rare and hard to train for. Additionally, common procedures such as chest tube insertions require practice to become sufficiently competent. Opportunities to hone these skills are essential in residency training. This project aimed to create instructional video modules for specific emergency medicine (EM) procedures and to gauge its utility as an adjunctive resource for procedural learning in the EM residency curriculum. **Methods**: Tutorial videos for clamshell thoracotomy, cricothyroidotomy, and chest tube insertion were filmed within a cadaver lab with step-by-step instructions. The footage was edited and overlaid with a prepared audio narration using Camtasia®/Apple® Video Editing software. These videos were embedded within modules that included foundational knowledge relevant to the procedures including anatomy, physiology and pathophysiology. The modules were peer-edited by licensed EM staff physicians and distributed to EM residents and staff physicians for analysis. Qualitative and quantitative analysis relied upon participants' answers to questions and a Modified Task Value Scale (measures the value of a module for overall learning), respectively. **Curriculum, Tool or Material**: Ten participants were included in the analysis, including EM residents (n = 6) and staff emergency physicians (n = 4). Qualitative feedback suggested that positive aspects of the modules included visuals, content, narration, and review of anatomy. Negative aspects included the lack of indications for procedures, technical details, real patient examples, and a speed up function. Quantitative feedback resulted in scores of 4 and above out of 5 (1 = lowest value, 5 = highest value) on the Motivated Task Value Scale across all aspects for all the modules. Furthermore, analysis revealed an average score of 3.9/5 for inclination to access more modules such as these, and a score of 4.4/5 for overall perception of the modules. **Conclusion**: Participants found the video modules valuable to their learning, both qualitatively and quantitatively. This study was limited by a small sample size of modules and a low number of participants. Furthermore, a more detailed analysis with further measures, including self-efficacy and self-confidence, would yield more comprehensive conclusions. However, video modules provide an effective and easily accessible adjunctive tool to acquire skill and confidence with EM procedures, for medical learners and staff physicians.
Keywords: EM procedural skills, innovations in EM education, video-based learning

P033

Clinical and laboratory characteristics of patients presenting to a tertiary care centre emergency department with invasive Group A Streptococcus infections

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Introduction: According to the Public Health Agency of Canada, the rate of invasive Group A Streptococcus (iGAS) has more than doubled

since it first became a notifiable disease in 2000. Our objectives were to describe the clinical and laboratory characteristics of iGAS in a geographic area that sees a relatively high volume of cases annually. **Methods**: We conducted a retrospective chart review of all adult and pediatric patients presenting to the Thunder Bay Regional Health Sciences Centre Emergency Department from January 2016 to December 2017 with a hospital discharge diagnosis of iGAS infection using ICD-10 codes. Patient demographics, host characteristics, triage vital signs, laboratory values, culture sites, and disposition were analyzed using univariate and bivariate statistics. **Results**: Forty-five cases of iGAS were identified over 2 years, with a mean age of 45 years (SD 18). The most prevalent associations were male sex (69%), diabetes mellitus (44%), current or previous alcohol abuse (38%), and current or previous intravenous drug use (33%). Prevalence of iGAS was roughly two times the national average in 2016 (11.5 per 100,000) and four times the national average in 2017 (25.5 per 100,000). Mean triage vital signs included a systolic blood pressure of 126 mmHg (SD 24), diastolic blood pressure of 73 mmHg (SD 16), temperature of 37.3°C (SD 1.4), oxygen saturation of 97% (SD 2), heart rate of 113 beats per minute (SD 22), and respiratory rate of 22 breaths per minute (SD 7). Mean laboratory values revealed a white blood cell count of 17,500 cells/μL (SD 9,800) and C-reactive protein of 243 mg/L (SD 144). A higher Laboratory Risk Indicator for Necrotizing Fasciitis (LRINEC) score was positively correlated with longer hospital length of stay ($r = 0.46$, $p < 0.01$). **Conclusion**: Despite its morbidity and mortality, iGAS infections often present insidiously with only mild abnormalities in triage vital signs, and require a high index of suspicion by the emergency physician for a prompt diagnosis, particularly in at-risk populations such as patients with diabetes mellitus or those who misuse alcohol or drugs.

Keywords: Streptococcal infections, Streptococcus pyogenes, vital signs

P034

Identifying unmet palliative care needs in the emergency department

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Introduction: The goal of palliative care (PC) is to improve quality of life for both patients and families facing a life-limiting illness. Many individuals in need of PC present to the Emergency Department (ED) with symptomatic complaints. Therefore, the ED may be a good place to connect patients with PC teams. Unfortunately, a lack of communication between patients and medical teams may result in admission to hospital even if this no longer aligns with the goals of care. The aims of this study were to identify the proportion of ED patients with unmet PC needs and to determine if access to rapid outpatient PC follow-up could reduce unnecessary admissions. **Methods**: University Health Network (UHN) is an urban academic centre with EDs at two sites, Toronto General Hospital (TGH) and Toronto Western Hospital (TWH). A consecutively enrolled sample of 417 patients that presented to these EDs between July 1-August 14, 2018 was taken. ED nurses and physicians were asked to complete a content validated PC screening tool on all eligible patients. Patients were eligible for screening if they (1) were >18 years of age, (2) had been designated a level 2-5 according to the Canadian Triage and Acuity Score, and (3) had been triaged to the subacute or acute areas of the department. **Results**: Across both sites, 45% of patients screened had a life-limiting illness and 30% had unmet PC needs. Among those with unmet PC needs, 79% had no identifiable involvement with a PC team. TWH had fewer patients with a life-limiting illness compared to TGH (31% vs 57%), but higher rates of unmet PC needs (81% vs 59%, confidence interval for the difference: 8%-34%, $p = .003$) and less PC involvement (6% vs 24%, confidence interval for the difference: 4%-30%, $p < .01$). 73% of patients at UHN with unmet PC needs were likely to be admitted to hospital. In 14% ($n = 17$) of these cases, admissions were felt by physicians to have potentially been avoided if rapid PC follow-up was available. **Conclusion**: A high percentage of patients presenting to the EDs at UHN have life-limiting illnesses with unmet PC needs. A rapid access outpatient PC clinic, available for referral from the ED, may help to both connect patients with the resources they need and avoid admission to hospital.

Keywords: emergency, palliative, unmet

P035

Impact of EMS direct referral to community care on emergency department utilization

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Introduction: The Community Referral by Emergency Medical Services (CREMS) program was implemented in January 2015 in Southwestern Ontario. The program allows Paramedics interacting with a patient to directly refer those in need of home care support to their local Community Care Access Centre (CCAC) for needs assessment. If indicated, subsequent referrals are made to specific services (e.g. nursing, physiotherapy and geriatrics) by CCAC. Ideally, CREMS connects patients with appropriate, timely care, supporting individual needs. Previous literature has indicated CREMS results in an increase of home care services provided to patients. **Methods**: The primary objective of this project is to evaluate the impact of the CREMS program on Emergency Department utilization. Data for all CCAC referrals from London-Middlesex EMS was collected for a thirteen month period (February 2015-February 2016). For all patients receiving a new or increased service from CCAC the number of Emergency Department visits 2 years before referral and 2 years after referral were calculated. A related samples Wilcoxon Signed Rank Test was performed to examine the difference in ED visits pre and post referral to CCAC. **Results**: There were 213 individuals who received a new or increased service during the study timeframe. Median [IQR] patient age was 77 [70-85.5]. 113/213 (53%) of patients were female. The majority of patients 135/213 (63.4%) were a new referral to CCAC. The median [IQR] number of hospital visits before referral was 3 [1-5] and after referral was 2 [0-4]. There was no significant difference in the overall number of ED visits before versus after referral (955 vs 756 visits, $p = 0.051$). **Conclusion**: Community based care can improve patient experience and health outcomes. Paramedics are in a unique position to assess patients in their home to determine who might benefit from home care services. CREMS referrals for this patient group showed a trend towards decreased ED visits after referral but the trend was not statistically significant.

Keywords: community care, emergency medical service

P036

Digoxin immune fab treatment for digoxin and non-digoxin cardioactive steroid toxicity: a scoping review

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Introduction: Cardioactive steroid poisoning occurs worldwide with the use of pharmaceutical digoxin and botanical cardiac glycosides. The wholesale price of the antidote, digoxin immune fab, has increased over 300% from 2010 to 2015. Our objective was to identify gaps in the existing literature with respect to the use of digoxin immune fab in cardioactive steroid toxicity in acute care settings. **Methods**: We used scoping study methodology, as described by Arksey and O'Malley, to assess the range and scope of empiric research and will report: 1) sources of cardioactive steroid toxicity in acute settings; 2) doses of digoxin immune fab used in treatment; and, 3) intervention outcomes of acute cardioactive steroid toxicity following the administration of digoxin immune fab as first or second-line therapy. We collaborated with a library scientist to devise search strategies for PubMed, CINAHL, EMBASE, CENTRAL and Toxnet. We sought unpublished literature through the Canadian Electronic Library, Proquest, and Scopus and searched reference lists of included studies. We hand searched relevant conference proceedings and applicable guidelines. Two reviewers independently reviewed titles and abstracts using predetermined criteria. Using a structured data abstraction form, two reviewers independently extracted data. All discrepancies were resolved through consensus. **Results**: Our search strategy yielded 3458 results. After screening titles and abstracts 384 underwent full text screening. We included 147 studies and are currently extracting data from 12 French studies and 135 English studies. To date we have extracted data from 90 case reports and case series. **Conclusion**: Given concerns over rising costs, our findings will shed light on the extent of the evidence for use of digoxin immune fab in acute care settings.

Keywords: cardiac glycosides, digoxin immune fab

P037

The Devil may not be in the detail - training first-responders to administer publicly available epinephrine – microskills checklists have low inter-observer reliability

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Introduction: Improving public access and training for epinephrine auto-injectors (EAIs) can reduce time to initial treatment in anaphylaxis. Effective use of EAIs by the public requires bystanders to respond in a timely and proficient manner. We wished to examine optimal methods for assessing effective training and skill retention for public use of EAIs, including the use of microskills lists. **Methods**: In this prospective, stratified randomized study, 154 participants at 15 sites receiving installation of public EAIs were randomized to one of three experimental education interventions: A) didactic poster (POS) teaching; B) poster with video teaching (VID), and C) Poster, video, and simulation training (SIM). Participants were tested by participation in a standardized simulated anaphylaxis scenario at 0-months, immediately following training, and again at follow-up at 3 months. Participants' responses were videoed and assessed by two blinded raters using microksills checklists. The microskills lists were derived from the best available evidence and interprofessional process mapping using a skills trainer. The interobserver reliability was assessed for each item in a 14 step microskill checklist composed of 3-point and 5-point Likert scale questions around EpiPen use, expressed as Kappa Values. **Results**: Overall there was poor agreement between the two raters. Being composed or panicked had the highest level of agreement $K = 0.7$, but a result that did not reach statistical significance (substantial agreement, $p = 0.06$) calling for EMS support has the second highest level of agreement, $K = 0.6$ (moderate agreement, $p = 0.01$), the remainder of the items had very low to moderate agreement with a Kappa value range of -103 to 0.48. **Conclusion**: Although microskills chesklists have been shown to identify areas where learners and interprofessional teams require deliberate practice, these results support previously published evidence that the use of microskills checklists to assess skills has poor reproducibility. Performance will be further assessed in this study using global rating scales, which have shown higher levels of agreement in other studies.

Keywords: education, epinephrine auto-injectors, first responders

P038

A procedural skills needs assessment targeting physicians providing emergency department coverage in rural Newfoundland and Labrador

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Introduction: Maintaining competence in high-acuity low-occurrence (HALO) procedures is often difficult due to their infrequent occurrence. While simulation is a valuable tool to hone skills, providing effective simulation-based education (SBE) to learners outside academic centers can be challenging. Utilizing a mobile tele-simulation unit (MTU) with expert instruction from a geographically separated mentor could prove a valuable approach to overcoming barriers in this setting. However, to maximize benefit and buy-in, the training modules developed for this unique delivery method must align with the needs of those practicing in rural settings. **Objectives**: - To evaluate the procedural skills training needs of emergency medicine (EM) physicians in rural Newfoundland and Labrador (NL) - To inform the development of simulation modules designed for use in a MTU **Methods**: A web-based needs assessment was distributed to physicians registered with the NL Medical Association, working in rural locations, and having EM listed as their primary specialty. Participants evaluated their comfort, performance frequency and desire to have further training for 12 HALO procedures. Two EM physicians selected these from a broader list of core procedural skill competencies for CCFP-EM residents at Memorial University. Participants were also able to suggest other procedures that might benefit from SBE. **Results**: The data collection occurred for 8 weeks with a 68% response rate ($N = 22$). No respondents had formal EM training outside of exposure in family medicine residency. 60% had 10+ years practicing EM. Chest tube insertion (100%), difficult intubation (92.3%) and surgical airway (92.3%) were the procedures that most respondents felt required more SBE. In practice, they most often performed bag-valve ventilation, splint application and procedural sedation (>10 per year). Additional procedures felt to require SBE were central venous line placement and trauma assessment. Opportunities to participate in SBE were limited (66.7%-less than annually). Despite this, most participants agreed SBE would be a significant benefit if accessible (93.3%). The greatest barriers to SBE included lack of equipment, rural location, and time necessary for travel to larger centres. **Conclusion**: The provision of medical care in rural settings can be particularly challenging when HALO procedures must be performed. Unique delivery methods of SBE targeted to the needs of rural practitioners may help bridge gaps in knowledge and technical skills.

Keywords: procedural skill, rural practice, simulation-based education

P039

The iterative evaluation and development of a core and high-acuity low-occurrence simulation-based procedures training program for emergency medicine trainees

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Introduction: Competency-based skills development has driven the evolution of medical education. Simulation-based education is established as an essential tool to supplement clinical encounters and it provides the opportunity for low-stakes practice of common and high-acuity low-occurrence (HALO) procedures and scenarios. This is particularly important for emergency medicine trainees working to build confidence, knowledge, and skills in the field. **Methods**: In the procedural training sessions, learners rotate through 6 small-group stations over a 3-hour period. Skills topics are determined from faculty input, prior session feedback, and literature reviews. Topics included chest tubes, airway intervention, lumbar punctures and trauma interventions. Online content and brief written materials are used for pre-session learning. The small groups use hands-on faculty-guided training, with real-time feedback. Printed materials supplement key learning points at the stations. A combination of low-fidelity task trainers and simulated patients are used for practice and demonstration. R3 EM residents have the opportunity to mentor junior learners. Brief participant surveys are distributed at each session to gather qualitative and quantitative feedback. **Results**: Feedback forms were completed by 79/85 (92.9%) learners over a period of 4 years (2015-2018). Participants included medical students (11.8%), EM residents (52.9%), and non-EM residents (35.3%). 84.8% (67/79) gave positive qualitative feedback on the sessions, citing points such as the beneficial practice opportunities, quality of instruction, and utility of the models. Updated surveys (N = 26) used a 5-point Likert scale (1 = disagree strongly; 5 strongly agree) in addition to qualitative feedback. Participants indicated that sessions were valuable, and informative (M = 4.692, SD = 0.462; M = 4.270, SD = 0.710). They reported increased understanding of procedures discussed, and they were likely to recommend the session (M = 4.301, SD = 0.606; M = 4.808, SD = 0.394). **Conclusion**: The ongoing evaluation of our mentor guided hands-on low-fidelity and hybrid simulation-based procedural skills sessions facilitates meaningful programmatic changes to best meet the needs of EM learners. Sessions also provide a forum for EM resident mentorship of junior learners. Feedback indicates learners enjoyed the sessions and found this to be an engaging and effective instructional modality.

Keywords: education, procedures, simulation

P040

Paramedic perception of their role in the emergency department

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Introduction: Inter-disciplinary interaction in the Emergency Department (ED) is critical for good patient care. The perception of paramedics' experience in this interaction is not well described in the literature. This project gives voice to paramedics' understanding of their role in the ED. **Methods**: Qualitative thematic framework analysis of digitally recorded, semi-structured, telephone interviews of 11 paramedics from one urban and one rural Paramedic Service in southwestern Ontario. Recordings and field notes were repeatedly reviewed and discussed by two researchers. A conceptual framework was constructed from themes emerging from the data. **Results**: Paramedics interviewed had 7-33 years of primary, advanced, or critical care experience. Three major themes emerged. (1) Patient advocate – Paramedics present the patient pre-hospital context and course of care information. They feel this information is essential and must be communicated. (2) Communication – Concerns raised that information is not listened to and valuable information is lost or ignored. A formal 30-second 'pause' for a structured paramedic to ED staff handover was seen as beneficial. Paramedics also want clinical feedback and outcome information from ED staff. No formal mechanism exists to obtain this. (3) Respect – When it exists, it is often based upon personal relationships between individuals. Paramedics feel when ED staff don't understand their scope of practice, their skills and abilities are ignored. In smaller EDs, paramedics also see themselves as a resource to help the ED staff with technical procedures. They need respect to do this. **Conclusion**: Paramedics' perceive themselves as providing valuable information and advocacy for their patients in the Emergency Department. In order to present this information, they require uninterrupted time, as short as 30-seconds, for communication. Their relationship with the ED staff is further strengthened by mutual respect and understanding of each discipline's scope of practice and interdisciplinary teamwork. Paramedics would like more feedback on clinical outcomes and on their pre-hospital care. Some areas for practice change suggested by this study include: time for un-interrupted communication of pre-hospital information, formal feedback, and reflection on how to improve interdisciplinary interactions.

Keywords: paramedics, role, self-perception

P041

Does the involvement of learners in emergency department patient assessments result in an increased rate of short-term return visits?

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Introduction: Learners, ether medical students or residents, often provide the initial assessment of patients visiting the Emergency Department (ED). Their involvement in ED patient care has been shown to increase length of stay, time to disposition decision, utilization of imaging and admission rates. It is unclear, however, if learners have an impact on the rate of short-term unscheduled return visits. The objective of this study was to determine if the involvement of learners in ED visits increases the rate of short-term unscheduled return visits. **Methods**: This study was a retrospective analysis of ED visit data at a single tertiary care center over a one-year period. Short-term unscheduled return visits (return visits) were defined as ED visits presenting within 72 hours of discharge from an initial non-admit ED visit and resulting in an admission to an inpatient unit on the second visit. The primary outcome was the rate of return visits for each staff physician, with and without learners involved during the initial visit. The secondary outcome assessed the interaction of level of training (medical student year 3, 4, resident year 1, 2, etc.) on return visit rates. For the primary outcome, statistical analysis was with a Wilcoxon Matched Pairs test; staff alone vs with learners. A Kruskal-Wallis test was used to compare learner level of training. **Results**: Return visits accounted for 1858 (1.09%) of all visits (N = 172494) to this tertiary care ED over the one-year study period. Return visits were statistically more likely when learners were involved in the initial ED visit (1.16%, CI 0.12), compared to initial visits seen by staff

physicians alone (0.88%, CI 0.09) ($p < 0.0001$). Return rates were statistically higher for PGY2 (1.67% CI 0.35) and PGY3 (1.66% CI 0.28) residents compared to staff physicians alone ($p < 0.0001$). There was no difference in return visit rates between staff physicians and third year medical students (1.07% CI 0.27), fourth year medical students (1.21% CI 0.37), PGY1 (1.42% CI 0.22), PGY4 (1.23% CI 0.54) or PGY5 (1.33% CI 0.49) residents. **Conclusion**: This study demonstrated that the involvement of learners in ED patient assessments increased the rate of short-term unscheduled return visits. Moreover, return visit rates were highest for PGY2 and PGY3 residents. Further work is needed to understand the factors that contribute to this phenomenon.

Keywords: bounce backs, short-term unscheduled return visits

P042

Pilot study for the inter-arm blood pressure systematic measurement during the diagnosis of transient ischemic attack in the emergency department

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Introduction: Our principal aim was to document the feasibility of the systematic measurement of the inter-arm blood pressure difference (IABPD) during an episode of transient ischemic attack (TIA) or mild stroke diagnosed in the Emergency Department (ED). As secondary goal was to compare the systolic blood pressure (BP) at triage with the systolic BPs measured during the IABPD. **Methods**: This is a single center pilot study. Patients presenting in the ED for a diagnosis of TIA were recruited. Once patient has been triaged and diagnosed of TIA, a research assistant made sure that the patient lay on a stretcher for at least 5 minutes. Two automated sphygmomanometers were applied, on each arm. No specific device or device calibration were required. Three consecutive simultaneous BP readings were performed, inverting cuffs arm to arm between each reading. Only the last two set of readings were used to calculate the mean IABPD. This method enables to minimize the error coming from the potential sphygmomanometers' inaccuracies. **Results**: 32 patients were recruited from June to September 2017 and all had a successful IABPD measurement. Four patients had an IABPD >10 mmHg, varying from 1.5 to 13 mmHg when the left arm was higher and from 1 to 61 mmHg when the right arm was higher. Of the 22 patients where the triage BP arm side selection was recorded, only 11 were congruent with the arm presenting the highest BP during the IABPD measurement. Selecting of the arm with the highest BP value may better reflect cerebrovascular risk exposition. The mean systolic BP at triage was 159.3 mmHg (95%CI: 144.9-173.7) compared to144.8 mmHg (95%CI: 132.9-156.7) if the arm with the highest value during the IABPD measurement is selected and 142.4 mmHg (95%CI: 130.8-154.0) if the same arm as triage is selected. The p-value for these differences were 0.003 and 0.001 respectively. The patient which presented the IABPD of 61 mmHg, had a stroke 3 days after its ED visit which subsequently led to her death 10 days later. **Conclusion**: Our results show that the systematic IABPD measurement using a pragmatic approach in the ED is feasible and is ready to investigate its use in the context of a new TIA or mild stroke. This information may contribute to a better discrimination of the short-term risk of stroke and may help to diagnose acute aortic dissection, monitor more accurately BP during hyperacute stroke or estimate intracerebral hemorrhage risk if systemic thrombolysis is considered.

Keywords: Interarm blood pressure, pragmatic method, transient ischemic attack

P043

Trauma team leaders in Canada: A national survey

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Introduction: It was demonstrated that the early trauma team activation (TTA) could improve younger trauma patients outcomes and mortality rates. However, the link between older patient prognosis improvement and the activation / effectiveness of the Trauma team (TT) is still unclear. There is also a lack of information about the exact and optimal structure of TTs and their activation criteria, which may differ across centers. The main objective of this study is to provide a description of the current TT available in level 1 and 2 centres across Canada. **Methods**: In 2017, a survey using a modified Dillman technique was sent to 210 health professionals scattered across all Canadian trauma care facilities. The survey included questions regarding 1) the presence and the composition of a TT, 2) the established TT activation criteria, and finally 3) the initial patient care. **Results**: A total of 107 (57%) completed surveys were received. Among them, only 22 (11.7%) were from level 1 or 2 centres and were therefore considered for analyses. Seventeen respondents had a TT in their centre, and they all shared their TT activation criteria (1 to 27 different indications). Most frequently mentioned criteria were: suspected injuries (58.8%), judgment of the emergency physician (41.2%), systolic blood pressure (47.1%), Glasgow Coma score (35.3%) and respiratory rate (28%). In presence of a prehospital care warning trauma, the initial assessment of a severely injured patient is exclusively completed by a member of the TT for only 35.1% of the respondents. For 11.8% of respondents, TT coordinates airway management. For 64.7% of participants, the TT leader is the dedicated care provider to accompany patients until final orientation. **Conclusion**: These results suggest a great variability across Canada regarding the roles assumed by the TT, but also regarding the activation criteria leading them to take action.

Keywords: emergency care, polytrauma, trauma team

P044

Use of a gait tracking device to count steps of older emergency department patient

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Introduction: Delirium is a common complication among older people who need care in the emergency department (ED). Mobility is an evidence-based non-pharmacologic strategy shown to reduce delirium and functional decline among older patients in the acute care setting. However, previous research has shown that compliance with mobility is important to achieve this decreased incidence of delirium. Gait tracking devices have been used in previous studies to accurately measure steps, engagement and intensity of physical activity in older hospitalized patients.The objectives of this study are to compare the feasibility and validate the accuracy of three accelerometer-based gait tracking devices. This is the first step in a program of research to objectively measure mobility among older ED patients as a potential marker of delirium risk. **Methods**: This is a prospective, observational study of patients 65 years of age and older during their ED visit. We excluded those with critical illness, unable to communicate or

provide consent (language barrier, aphasia); and those with any ambulatory impediments. Consenting participants wear the gait trackers for the duration of their stay or for a minimum of 8 hour, and ambulate as normally as they would in their home. Devices were retrieved when the patient was admitted, discharged or, after 8 hours and the steps count was then recorded from an online interface. Our primary feasibility measure is the proportion of eligible patient for which we are be able to recover the tracker and record their steps. The primary validation endpoint will be the concordance between steps recorded by the gait tracking device compared to a gold standard manual step count over a fixed distance. We will report proportions with exact binomial 95% confidence intervals (CI) for feasibility and validity endpoints. **Results**: Preliminary data from an initial pilot phase includes 7 participants who wore a gait tracking device during their ED visit. Mean age was 79.7 years (+/−5.76) and 57% were females. Devices were worn by participants and recovered by research staff in all 7 cases (100%, 95% CI: 59 – 100). Data from online interface has been collected from 6 participants (85%, 95%CI: 42 – 99). Mean step count by observer was 86.17 +/− 4 (95% CI 82.2 – 90.2) and 70.3 +/− 4 (95%CI 66-74.3) by gait tracker. **Conclusion**: Our preliminary data suggests that use of gait-tracking devices in the ED is feasible.
Keywords: delirium prevention, gait tracking device, mobility

P045

Palliative care nurse specialist in the emergency department: a pilot project

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Background: Patients presenting to the Emergency Department (ED) with unmet palliative care needs are often admitted to hospital and this can be a pivotal point in their subsequent health care journey. Literature from the United States supports the integration of palliative care resources in the ED and to our knowledge, this has yet to be done in a Canadian setting. **Aim Statement:** To develop, implement, and evaluate a model to support patients presenting to the ED with unmet palliative care needs. **Measures & Design**: A pilot project was implemented in one campus of the ED at a tertiary care academic center in Ottawa, Ontario. A palliative care nurse specialist was available for consultation with goals to: a) reduce admission to hospital for patients choosing to have a palliative approach to their care; b) increase coordination between ED and community resources; and c) be a resource for ED staff. Referral criteria were developed after systematic review of the literature and in consultation with palliative and emergency medicine experts. **Evaluation/Results:** Over the course of the study period (9 months), 50 referrals were made. The primary reason for referral was for increased community supports. Patient outcomes: 10 patients were discharged to hospice/palliative care units from the ED, 38 patients were discharged home. Of those discharged home, 66% had no returns to ED within 30 days. Qualitative feedback collected via pre and post survey has been extremely supportive from ED health care practitioners and community palliative care providers. **Discussion/Impact:** This ongoing project has led to positive, patient centered outcomes and decreased admission to acute care hospital. Ongoing evaluation will include consideration of Ontario Palliative Care Network quality indicators and cost-analysis to determine impact on health care system.
Keywords: palliative care, patient centered care, quality improvement and patient safety

P046

Students as first responders: A survey of Canadian campus emergency medical response teams

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Introduction: Canadian post-secondary campuses are densely-populated communities and the first home-away-from-home to many students participating in various academic programs, new social activities, and on-campus athletic activities. The diversity of on-campus activities combined with the high-stress of academic programs results in illness and injury rates that may increase the strain on emergency medical systems. Existing on some campuses for more than 30 years, campus emergency medical response teams (CEMRTs) address the need for a local emergency medical service that can provide first-aid in low-acuity situations and rapid response to high-acuity emergencies. In Canada, many student-run volunteer-responder CEMRTs exist but the range of their service capabilities, operations, and their call-volumes have not been described previously. This study aims to fill this knowledge gap. **Methods**: We surveyed the 30 known campus emergency medical response teams identified through membership in the Canadian Association of Campus Emergency Response Teams. The 32-question survey asked information on their level of training (standard first aid [SFA], first responder [FR], emergency medical responder [EMR]), service operations including call volume, and funding model. This study was approved by the Western University Institutional Review Board. **Results**: Twenty-four teams completed the survey (80%); the majority of which are located in Ontario (70%, 16 teams). One team reported that they are no longer in operation. Eleven teams (48%) have medical directors. Nine teams (39%) reported responding to ≤100 calls/year, 11 teams (48%) reported 100-500 calls/year, and 3 teams (13%) reported >500 calls/year. Responders of two teams (9%) maintain training at SFA level; 14 teams (61%) have some or all responders with FR training; and 6 teams (26%) have some or all members certified at EMR level. Twenty-one teams (91%) are equipped with AEDs and 19 teams (83%) are equipped with oxygen. Common medications carried include epinephrine (13 teams, 57%), naloxone (12 teams, 52%), and acetylsalicylic acid (9 teams, 39%). **Conclusion**: Canadian post-secondary campuses have highly-active student-run volunteer CMERTs. Considerable variability in the services provided may reflect the unique needs of the campuses they serve. CEMRTs may reduce low-acuity case demand on local emergency medical response and emergency department services in some communities; their impact on system demand and costs is the subject of future work.
Keywords: first responder, pre-hospital care, volunteer

P047

Understanding the expert approach to managing frailty in the emergency department

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Introduction: Frailty is a state of vulnerability affecting older adults, and has been associated with adverse events such as increased risk of institutionalization, falls, functional decline, and mortality. Previous research suggests that emergency department (ED) physicians are much less comfortable managing the complex care needs of frail, older adults. The objective of this study was to identify successful

strategies and expert skills that ED physicians possess to optimally manage the frail, older patient. **Methods**: An interpretive descriptive qualitative study was conducted. One of the investigators contacted the site leads of 12 academic and community EDs across Canada to identify ED physicians who they perceived as being highly skilled in the care of frail, older patients. 22 individual physicians were identified and 13 physicians representing 10 EDs were invited to participate in a 30-minute semi-structured interview. Transcripts were coded by two members of the research team. Data collection is ongoing and analyses will occur until thematic saturation. **Results**: All participants indicated they were very comfortable managing the frail, older patient in the ED. Awareness of issues related to this patient population were triggered by both clinical and personal experiences, as well as institutional priorities. When asked how they developed their specific skills for this patient population, participants stated they received limited formal training during residency and early practise, but relied on situational learning, access to role models and engagement in self-directed learning. Participants identified three predominant management strategies for the care of the frail, older patient: thorough patient interaction at the start of the clinical encounter to maximize efficiency; engaging in teamwork to manage complex issues; and early involvement of the family/caregivers. Interestingly, not all participants used the term frailty, however most reflected principles of the concept in their discussion. **Conclusion**: Currently, principles of caring for frail, older adults are not widespread in emergency medicine residency training. These findings suggest that frailty care frequently requires an alternative clinical approach, which is often derived from personal experience, self-directed and experiential learning. Future educational initiatives should derive, implement and evaluate a wide-spread curriculum to teach the skills required to optimally care for these patients.
Keywords: emergency medicine, frailty, geriatrics

P048

Current practices of management for mild traumatic brain injuries with intracranial hemorrhage

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Introduction: The radiological and clinical follow-up of patients with a mild traumatic brain injury (mTBI) and an intracranial hemorrhage (ICH) is often heterogeneous, as there is no official guideline for CT scan control. Furthermore, public sector health expenditure has increased significantly as the number of MRI and CT scan almost doubled in Canada in the last decade. Therefore, the main objective of this study was to describe the current management practices of mTBI patients with intracranial hemorrhage at two level-1 trauma centers. **Methods**: Design: An historical cohort was created at the CHU de Québec – Hôpital de l'Enfant-Jésus (Québec City) and Hôpital du Sacré-Coeur (Montréal). Consecutive medical records were reviewed from the end of 2017 backwards until sample saturation using a standardized checklist. **Participants**: mTBI patients aged ⩾16 with an ICH were included. **Measures**: The main and secondary outcomes were the presence of a control CT scan and neurosurgical consultation/admission. **Analyses**: Univariate descriptive analyses were performed. Inter-observer measures were calculated. **Results**: Two hundred seventy-four patients were included, of which 51.1% (n = 140) came from a transfer. Mean age was 60.8 and 68.9% (n = 188) were men. Repeat CT scan was performed in 73.6% (n = 201) of our patients as 12.5% showed a clinical deterioration. The following factors might have influenced clinician decision to proceed to a repeat scan: anticoagulation (association of 87.1% with scanning; n = 27), antiplatelet (84.1%; 58), GCS of 13 (94.1%; 16), GCS of 14 (75%; 72) and GCS of 15 (70.2%; 111). 93.0% (n = 254) of patients had a neurosurgical consultation and only 6.7% (17) underwent a neurosurgical intervention. **Conclusion**: The management of mild traumatic brain injury with hemorrhage uses a lot of resources that might be disproportionate with regards to risks. Further research to identify predictive factors of deterioration is needed.
Keywords: intracranial hemorrhage, management, mild traumatic brain injuries

P049

Post-intubation sedation in the emergency department: a survey of national practice patterns

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Introduction: Endotracheal intubation (ETI) is a lifesaving procedure commonly performed by emergency department (ED) physicians that may lead to patient discomfort or adverse events (e.g., unintended extubation) if sedation is inadequate. No ED-based sedation guidelines currently exist, so individual practice varies widely. This study's objective was to describe the self-reported post-ETI sedation practice of Canadian adult ED physicians. **Methods**: An anonymous, cross-sectional, web-based survey featuring 7 common ED scenarios requiring ETI was distributed to adult ED physician members of the Canadian Association of Emergency Physicians (CAEP). Scenarios included post-cardiac arrest, hypercapnic and hypoxic respiratory failure, status epilepticus, polytrauma, traumatic brain injury, and toxicology. Participants indicated first and second choice of sedative medication following ETI, as well as bolus vs. infusion administration in each scenario. Data was presented by descriptive statistics. **Results**: 207 (response rate 16.8%) ED physicians responded to the survey. Emergency medicine training of respondents included CCFP-EM (47.0%), FRCPC (35.8%), and CCFP (13.9%). 51.0% of respondents work primarily in academic/teaching hospitals and 40.4% work in community teaching hospitals. On average, responding physicians report providing care for 4.9 ± 6.8 (mean ± SD) intubated adult patients per month for varying durations (39.2% for 1–2 hours, 27.8% for 2–4 hours, and 22.7% for ≤1 hour). Combining all clinical scenarios, propofol was the most frequently used medication for post-ETI sedation (38.0% of all responses) and was the most frequently used agent except for the post-cardiac arrest, polytrauma, and hypercapnic respiratory failure scenarios. Ketamine was used second most frequently (28.2%), with midazolam being third most common (14.5%). Post-ETI sedation was provided by > 98% of physicians in all situations except the post-cardiac arrest (26.1% indicating no sedation) and toxicology (15.5% indicating no sedation) scenarios. Sedation was provided by infusion in 74.6% of cases and bolus in 25.4%. **Conclusion**: Significant practice variability with respect to post-ETI sedation exists amongst Canadian emergency physicians. Future quality improvement studies should examine sedation provided in real clinical scenarios with a goal of establishing best sedation practices to improve patient safety and quality of care.
Keywords: post-intubation, sedation

P050

Unplanned return visits to the paediatric emergency department: Caregiver and physician perspectives

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Introduction: Unplanned return visits to the pediatric emergency department contribute to overcrowding and are used as a quality measure. They have not been well characterized in the literature making it difficult to design interventions to reduce unnecessary return visits. The aim of this study was to understand the reasons for return from the caregiver and physician perspective. **Methods**: This was a cross sectional survey performed on a convenience sample of unplanned return visits within 72 hours at the IWK Health Centre ED between February and October 2016. Exclusion criteria were: planned return visit, admission during the index visit, or triaged as Canadian Triage and Acuity Score (CTAS) 1 on return visit. Caregiver and physician surveys were developed based on themes identified in published literature. The caregiver was approached to complete a survey after triage and the most responsible physician from the return visit was asked to complete a survey immediately after discharge of the patient from their care. Demographic and clinical data were collected from the ED record from the index and return visits. The primary outcome measure was most important reason for return from the caregiver perspective. **Results**: There were 461 return visits during the study period and 67 caregivers (14.5%) were included in the final analysis. The response rate for the physician survey was 71%. Caregivers and physicians reported that the most important reason for return was a perceived progression of illness requiring reassessment (79.1% and 66.7% respectively). The majority of caregivers had a family physician on record (95%) but a minority attempted to access their family physician (19.4%) or a walk-in clinic (11.9%). Of those who contacted their family physician only 3 (23%) were offered an appointment within 48 hours and of those who did not contact their family physician 21 (38.2%) stated they would not be able to get an appointment in a reasonable amount of time. Despite this 97% would have trusted their family physician to manage their child's illness. Physicians surveyed stated that the return visit was necessary in 64.6% of cases. **Conclusion**: Caregivers returned to the ED due to a perceived progression of disease. While some cases may have been appropriate for management in a primary care setting, perceived difficulty with timely access was a barrier. Improved caregiver education about the natural history of disease and the urgency of follow up may reduce return ED visits.

Keywords: communication, pediatrics, unplanned return visits

P051

Interventions to improve emergency department consultation processes: a systematic review

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Introduction: Emergency Department (ED) consultations are often necessary for safe and effective patient care. Delays in throughput related to ED consultations can increase a patient's ED length of stay (LOS) and contribute to ED crowding. This review aimed to characterize and evaluate interventions to improve consultation metrics. **Methods**: Eight primary literature databases and the grey literature were comprehensively searched. Comparative studies of interventions to improve ED consultation metrics were included. Unique citations were screened for relevance and the full-texts of relevant articles were reviewed by two independent reviewers. Data on study characteristics and outcomes were extracted in duplicate onto standardized forms. Disagreements were resolved through consensus. Categorical variables are reported as proportions. Continuous variables are reported as the median of the means and total range. **Results**: After screening 2632 unique citations and 19 from the grey literature items, 24 studies were included. Seventeen interventions targeted specific conditions or speciality services, while the remainder targeted all ED presentations. Interventions fell into three broad categories: strategies to expedite patient care, including clinical pathways (42%); interventions to improve consultant responsiveness (33%); and addition of a specialized care team to the ED (25%). Overall, eight studies reported on the overall proportion of consults in the ED, of which six reported an increase in the consultation proportion (median: +0.6%, range: −11.3% to +49.6%). Six studies reported the proportion of consulted patients who were admitted, of which four reported an increase (median: +1.1%, range: −5.9% to +3.5%). On the other hand, six of seven studies reporting on time from request to consult arrival reported a decrease (median: −25 minutes, range: −66 to +3.8 minutes). Similarly, overall ED LOS was reported to be lower in 17/19 studies reporting this metric (median: −47.6 minutes, range: −600 minutes to +59 minutes). **Conclusion**: A variety of strategies have been employed to improve ED consultation processes and outcomes. Neither the proportion of consulted patients in the ED nor the proportion of admissions were improved; however, interventions appeared successful at improving consultant arrival times and overall ED LOS. Improvements in consultation processes may be an effective strategy to improve ED throughput and thereby reduce ED crowding.

Keywords: consultation, ED throughput, systematic review

P052

Breaking down the pieces: A scoping review exploring the components of image ordering interventions and trends in their outcomes in pediatric emergency medicine

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Introduction: Clinicians treating children in the emergency department (ED) are especially concerned with the efficacy and safety of imaging. Interventions to limit imaging have been proposed to maximize benefits and avoid risks; however, the types and effectiveness of interventions employed in pediatric EDs have not been examined in detail. **Methods**: Electronic databases and grey literature were systematically searched by a medical librarian. Comparative studies of ED-based interventions reporting computed tomography (CT), radiography (XR), or ultrasound (US) outcomes were included. Interventions introducing new imaging equipment or personnel to the ED, ED diversion strategies, and pre-admission protocols were excluded. At least two independent reviewers assessed each study for inclusion based on pre-defined criteria and extracted data. Disagreements were resolved through consensus. Descriptive results are reported. **Results**: Overall, 38 pediatric studies were included. Most (66%) interventions implemented two or more components; the most common intervention components were clinical guidelines or pathways (87%) and education or information (66%). Studies were categorized by presentation type: traumatic (n = 27); non-traumatic (n = 19), or combined 'all-comers' (n = 2). Included studies reported 62 imaging

outcomes (CT = 29; XR = 20; US = 13). Among traumatic studies, 26 imaging outcomes were reported; CT was the most commonly reported outcome (CT = 15; XR = 9; US = 1). Of the CT outcomes, 33% reported significant decreases and five decreased but were either not significant or did not report significance. XR significantly decreased in 44% (4/9). In the non-traumatic studies, the most common imaging outcome remained CT (12 outcomes); 58% of which reported significant decreases. XR was the second most frequent outcome, with 63% reporting significant reductions. Combined success of the interventions to reduce CT and XR was 60%. Reported changes in ordering were less consistent in US. **Conclusion**: Multifaceted passive interventions have been implemented to reduce imaging in pediatric EDs. Most reported some success changing ordering practices, specifically among patients with non-trauma presentations. Future research exploring relationships between intervention content, effectiveness, and fidelity may provide insight into how to develop more effective interventions to change image ordering in the ED and guide which presentations to target.

Keywords: diagnostic imaging, pediatric emergency medicine, systematic review

P053

Mismatches in pre-injury activities and return-to-activity advice received by concussion patients presenting to the emergency department

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Introduction: Patients with concussion often present to the emergency department (ED). Current guidelines recommend graded return to work and physical activity (i.e., sport, recreation and exercise activities); however, whether emergency physicians target this advice based on patient-reported activities is unknown. This study aimed to assess mismatches between physicians' rest and return-to-activity advice and self-reported pre-injury work and physical activity of adult concussion patients. **Methods**: Adults (>17 years) presenting with a concussion from April 2013 to April 2015 to a study ED with Glasgow coma scale score ≥13 were recruited by on-site research assistants. Data on patient characteristics (i.e., age, sex, employment, and physical activity level) and activity leading to injury were collected from structured patient interviews. A structured questionnaire collected data from the treating physician about discharge advice provided. "Working" was defined as employed or enrolled in any level of school at the time of injury. "Physically active" was defined by reporting regular exercise (≥2 times a week) or concussed during a sports-related activity. Proportions or medians (interquartile range [IQR]) are reported, as appropriate. **Results**: Physician questionnaires were completed for 198/248 enrolled patients (median age: 37 years [IQR: 23, 49]; 46% male). Overall, 89% (177/198) were working; 110/177 (62%) received return-to-work advice, while 10/21 (48%) patients also received return-to-work advice, despite not working. Mentally strenuous work/school duties were reported by 143 patients, of which 85 (60%) were recommended cognitive rest. Overall, 148 patients were physically active and 115 (78%) of these were recommended physical rest while 124 (82%) were advised on safe return to physical activity. On the other hand, 35/50 (70%) patients who were not physically active received advice on safe return to physical activity. Sustaining a sports-related injury significantly increased the likelihood of safe return to physical activity advice among physically active patients (Fisher's exact p = 0.001). **Conclusion**: There is a mismatch between concussed patients' pre-injury activities, and the rest and return-to-activity (i.e., work and physical activity) advice provided by emergency physicians. The possible effect of this mismatch on patient outcomes should be assessed in future research, as should strategies to improve emergency physician-patient communications around concussion management.

Keywords: concussion, emergency department, mild traumatic brain injury

P054

The effectiveness of emergency department-based interventions for patients with advanced or end-stage illness: a systematic review

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Introduction: Patients with advanced or end-stage illness frequently present to emergency departments (EDs), many of whom are in need of palliative care (PC). Emergency physicians have struggled in providing high quality care to these patients and there is a need to identify cost-effective PC interventions delivered in the ED to improve patient outcomes. The objective of this systematic review was to examine the effectiveness of ED-based PC interventions. **Methods**: A comprehensive search of nine electronic databases and grey literature sources was conducted to identify any comparative studies assessing the effectiveness of ED-based PC interventions to improve health outcomes of patients with advanced or end-stage illness. Two independent reviewers completed study selection, quality assessment, and data extraction. Differences were mediated via third-party adjudication. Relative risks (RR) with 95% confidence intervals (CIs) were calculated using a random effects model and heterogeneity (I2) was reported. **Results**: From 5882 potentially eligible citations, 12 studies were included. Two studies are currently on-going clinical trials, and as such, 10 studies were included in this analysis. The studies consisted of before-after studies (n = 5), RCTs (n = 4), and an observational cohort (n = 1). Interventions assessed among the included studies consisted primarily of ED-directed PC consultations (n = 6), while other studies assessed screening of patients with advanced or end-stage illness and PC needs (n = 2), education on PC for ED-staff (n = 1), and an ED-based critical care unit (n = 1). Infrequent reporting of important outcomes (e.g., Mortality, ED relapse) limited the ability of this review to conduct meaningful meta-analysis. There was no difference in patient mortality between two studies assessing ED-directed PC consultations (RR = 0.89; 95% CI: 0.71, 1.13; I2 = 0%). One before-after study (RR = 0.73; 95% CI: 0.47, 1.13) and two RCTs (RR = 2.19; 95% CI: 0.40, 11.92; I2 = 96%) did not identify significant differences in PC consultations intervention (implementation of ED-directed PC consultations) and control (usual care) patients. **Conclusion**: This review found limited evidence to support the recommendation of any particular ED-based intervention for patients presenting to the ED with advanced or end-stage illness. High quality studies and standardized outcome reporting are needed to better understand the impact of PC interventions in the ED setting.

Keywords: consultation, emergency department, palliative care

P055

Quality assessment and improvement evaluation of return visits to the emergency department for ultrasound

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Introduction: Depending on the time and day of initial Emergency Department (ED) presentation, some patients may require a return to the ED the following day for ultrasound examination. Return visits for ultrasound may be time and resource intensive for both patients and the ED. Qualitative experience suggests that a percentage of return ultrasounds could be performed at a non-ED facility. Our objective was to undertake a retrospective audit of return for ultrasound usage, patterns and outcomes at 2 academic EDs. **Methods**: A retrospective review of all adult patients returning to the ED for ultrasound at both LHSC ED sites in 2016 was undertaken. Each chart was independently reviewed by two emergency medicine consultants. Charts were assessed for day and time of initial presentation and return, type of ultrasound ordered, and length of ED stay on initial presentation and return visit. Opinion based questions were considered by reviewers, including urgency of diagnosis clarification required, if symptoms were still present on return, and if any medical or surgical treatment or follow up was arranged based on ultrasound results. Agreement between reviewers was assessed. **Results**: After eliminating charts for which the return visit was not for a scheduled ultrasound examination, 328 patient charts were reviewed. 63% of patients were female and median [IQR] age was 40 years [27-56]. Abdomen/pelvis represented 50% of the ultrasounds; renal 24%; venous Doppler 15.9%. Symptoms were still present and documented in 79% of cases. 22% of cases required a medical intervention and 9% an immediate surgical intervention. 11% of patients were admitted to hospital on their return visit. Outpatient follow-up based on US results was initiated in 29% of cases. Median [IQR] combined LOS was 479.5 minutes [358.5-621.75]. Agreement between reviewers for opinion based questions was poor (63%-96%). **Conclusion**: Ideally, formal ultrasound should be available on a 24 hour basis for ED patients in order to avoid return visits. A percentage of return for ultrasound examinations do not result in any significant change in treatment. Emergency departments should consider the development of pathways to avoid return visits for follow up ultrasound when possible. The low incidence of surgical treatment in those returning for US suggests that this population could be served in a non-hospital setting. Further research is required to support this conclusion.

Keywords: quality assessment, ultrasound

P056

Is lumbar puncture mandatory in the workup of infants 22 to 60 days old presenting to the emergency department with a fever without a source?

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Introduction: Fever is a common presenting complaint in the emergency department (ED). Febrile infants are at particularly high risk of serious bacterial infection including bacterial meningitis. Unfortunately, recommendations as to when to perform a lumbar puncture in febrile infants older than 21 days remain conflicting. Our study seeks to establish the prevalence of bacterial meningitis in infants 22 to 60 days old and to evaluate the performance of our local fever without a source (FWS) workup protocol at identifying bacterial meningitis. **Methods**: This analysis represents the results of a retrospective cohort study which took place in an academic pediatric ED in Quebec City. Infants 22 to 60 days old investigated for FWS, were included in the study. Premature infants (<37 weeks), as well as infants with chronic diseases, immunodeficiency, previous antimicrobial therapy, in-dwelling catheters, or septic shock were excluded. We evaluated the performance of our local FWS workup protocol which includes the Yale Scale, a complete blood count, blood culture, C-reactive protein, urinalysis and urine culture. The protocol recommends a lumbar puncture in all febrile infants <1 month old, and in all infants <3 months old with either leukocytes <5.0 or >15.0 X 10^9cells/L, petechia, or a Yale between 11 and 16. **Results**: We reviewed 1261 charts from 2012 to 2017, of which 920 met our inclusion criteria. In our cohort, 171 infants were 22 to 30 days old, 369 were 31 to 45 days old, and 380 were 46 to 60 days old. The proportion of infants with cerebrospinal fluid analysis in these 3 groups was 76% (n = 130), 25% (n = 98) and 12% (n = 46) respectively. In the entire cohort, two infants were diagnosed with bacterial meningitis resulting in a prevalence of 0.2% (95%CI: 0-0.5%); viral meningitis had a prevalence of 4.7% (95%CI: 3.3-6.1%). Sensitivity and specificity of the protocol were 100% and 52.8%; positive and negative predictive values were 0.4% and 100%, respectively. All charts were reviewed for 2 weeks following the index visit to screen for missed cases of bacterial meningitis. **Conclusion**: Systematically performing a lumbar puncture for workup of fever without a source in infants 22 to 60 days old appears unwarranted given the low prevalence of bacterial meningitis in this population. Our FWS workup protocol correctly identified the 2 cases of bacterial meningitis in our cohort. This is an ongoing study and more cases will be recruited to better evaluate the safety and performance of our protocol.

Keywords: fever without a source, infants 22 to 60 days old, lumbar puncture

P057

Evidence-based medicine (EBM) simulation: teaching real-time literature searching to emergency medicine residents using a flipped classroom and high-fidelity simulation

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Innovation Conept: Evidence-based medicine (EBM), including literature search skills, is an objective of the Emergency Medicine (EM) residency curriculum. Traditional teaching of this topic utilized a classroom-based, librarian-lead session that presented an overview of many search engines. Feedback from past sessions indicated that learners retained little after the session. To be effective, EBM needs to be brought to the bedside. We created a session to engage EM residents and improve their efficiency in literature searching during an EM shift. **Methods**: We conducted a needs assessment among EM residents in our program. In response to this and to maximize impact of teaching, we created an EBM workshop on literature searching that used a flipped classroom approach and high-fidelity simulation. The session was designed for a small group (12 junior residents), with the goals of being interactive, engaging and practice-relevant. Feedback was collected on the simulation experience. **Curriculum, Tool or Material**: With a librarian, we created a brief list of EM-relevant databases. It included tips for searching and links to the corresponding

sites / apps. Students received the list 7 days prior and were instructed to set up the resources on their smartphones. Pre-readings also covered the hierarchy of evidence and formulating a good clinical (PICO) question. All students participated in the high-fidelity simulation, with one volunteer leader. The case involved a stable patient. Residents proceeded with initial case assessment until they faced a management decision that required a literature search. All residents participated on their smart phones. Collectively, it took 5 minutes to find a study that adequately addressed the clinical question. The patient was managed accordingly and symptoms resolved. Feedback on the simulation was abundantly positive. Students found it engaging, practical and realistic. It helped them learn to efficiently search the literature while managing a stable patient. **Conclusion**: Using a multi-modal teaching strategy that includes simulation makes teaching EBM literature searching more interesting, engaging and applicable to EM practice. Future work will look at creating further sessions to reinforce and promote retention of key concepts and integrate them into EM practice.

Keywords: evidence-based medicine, Innovations in EM education, simulation

P058

Impact of an early mobilization protocol on outcomes in trauma patients admitted to the intensive care unit: a retrospective cohort study

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Introduction: Long-term immobility has detrimental effects for critically ill patients admitted to the intensive care unit (ICU) including ICU-acquired weakness. Early mobilization of patients admitted to ICU has been demonstrated to be a safe, feasible and effective strategy to improve patient outcomes. The optimal mobilization of trauma ICU patients has not been extensively studied. Our objective was to determine the impact of an early mobilization protocol on outcomes among trauma patients admitted to the ICU. **Methods**: We analyzed all adult trauma patients (> 18 years old) admitted to ICU over a 2-year period prior to and following implementation of an early mobilization protocol, allowing for a 1-year transition period. Data were collected from the Nova Scotia Trauma Registry. We compared patient characteristics and outcomes (mortality, length of stay [LOS], ventilator days) between the pre- and post-implementation groups. Associations between early mobilization and clinical outcomes were estimated using binary and linear regression models. **Results**: Overall, there were 526 patients included in the analysis (292 pre-implementation, 234 post-implementation). The study population ranged in age from 18 to 92 years (mean age 49.0 ± 20.4 years) and 74.3% of all patients were male. The pre- and post-implementation groups were similar in age, sex, and injury severity. In-hospital mortality was reduced in the post-implementation group (25.3% vs. 17.5%; p = 0.031). In addition, there was a reduction in ICU mortality in the post-implementation group (21.6% vs. 12.8%; p = 0.009). We did not observe any difference in overall hospital LOS, ICU LOS, or ventilator days between the two groups. Compared to the pre-implementation period, trauma patients admitted to the ICU following protocol implementation were less likely to die in-hospital (OR = 0.52, 95% CI 0.30-0.91; p = 0.021) or in the ICU (OR = 0.40, 95% CI 0.21- 0.76, p = 0.005). Results were similar following a sensitivity analysis limited to patients with blunt or penetrating injuries. There was no difference between the pre- and post-implementation groups with respect to in-hospital LOS, ICU LOS, or the number of ventilator days. **Conclusion**: We found that trauma patients admitted to ICU during the post-implementation period had decreased odds of in-hospital mortality and ICU mortality. Ours is the first study to demonstrate a significant reduction in trauma mortality following implementation of an ICU mobility protocol.

Keywords: intensive care unit, mobilization, trauma

P059

Early mobilization of trauma patients admitted to intensive care units: a systematic review and meta-analysis

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Introduction: Previous systematic reviews suggest early mobilization in the intensive care unit (ICU) population is feasible, safe, and may improve outcomes. Only one review investigated mobilization specifically in trauma ICU patients and failed to identify any relevant articles. The objective of the present systematic review was to conduct an up-to-date search of the literature to assess the effect of early mobilization in adult trauma ICU patients on mortality, length of stay (LOS) and duration of mechanical ventilation. **Methods**: We performed a systematic search of four electronic databases (Ovid MEDLINE, Embase, CINAHL, Cochrane Library) and the grey literature. To be included, studies must have compared early mobilization to delayed or no mobilization among trauma patients admitted to the ICU. Meta-analysis was performed to determine the effect of early mobilization on mortality, hospital LOS, ICU LOS, and duration of mechanical ventilation. **Results**: The search yielded 2,975 records from the 4 databases and 7 records from grey literature and bibliographic searches; of these, 9 articles met all eligibility criteria and were included in the analysis. There were 7 studies performed in the United States, 1 study from China and 1 study from Norway. Study populations included neurotrauma (3 studies), blunt abdominal trauma (2 studies), mixed injury types (2 studies) and burns (1 study). Cohorts ranged in size from 15 to 1,132 patients (median, 63) and varied in inclusion criteria. Most studies used some form of stepwise progressive mobility protocol. Two studies used simple ambulation as the mobilization measure, and 1 study employed upright sitting as their only intervention. Time to commencement of the intervention was variable across studies, and only 2 studies specified the timing of mobilization initiation. We did not detect a difference in mortality with early mobilization, although the pooled risk ratio (RR) was reduced (RR 0.90, 95% CI 0.74 to 1.09). Hospital LOS and ICU LOS were decreased with early mobilization, though this difference did not reach significance. Duration of mechanical ventilation was significantly shorter in the early mobilization group (mean difference −1.18. 95% CI −2.17 to −0.19). **Conclusion**: Our review identified few studies that examined mobilization of critically ill trauma patients in the ICU. On meta-analysis, early mobilization was found to reduce duration of mechanical ventilation, but the effects on mortality and LOS were not significant.

Keywords: intensive care unit, mobilization, trauma

P060

State of the evidence for prehospital use of point-of-care lactate in patients with sepsis: A report from the Prehospital Evidence Based Practice (PEP) program

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Introduction: Early and accurate diagnosis of critical conditions is essential in emergency medical services (EMS). Serum lactate testing may be used to identify patients with worse prognosis, including sepsis. Recently, the use of a point-of-care lactate (POCL) test has been evaluated in guiding treatment in patients with sepsis. Operating as part of the Prehospital Evidence Based Practice (PEP) Program, the authors sought to identify and describe the body of evidence for POCL use in EMS and the emergency department (ED) for patients with sepsis. **Methods**: Following PEP methodology, in May 2018, PubMed was searched in a systematic manner. Title and abstract screening were conducted by the program coordinator. These studies were collected, appraised and added to the existing body of literature contained within the PEP database. Evidence appraisal was conducted by two reviewers who assigned both a level of evidence (LOE) on a novel three tier scale and a direction of evidence (supportive, neutral or opposing; based on primary outcome). Data on setting and study design were also extracted. **Results**: Eight studies were included in our analysis. Three of these studies were conducted in the ED setting; each investigating the POCL test's ability to predict severe sepsis, ICU admission or death. All three studies found supportive results for POCL. A systematic review on the use of POCL in the ED determined that this test can also improve time to treatment. Five of the total 8 studies were conducted prehospitally. Two of these studies were supportive of POCL use in the prehospital setting; in terms of feasibility and the ability to predict sepsis. Both of these study sites used this early information as part of initiating a "sepsis alert" pathway. The other three prehospital studies provide neutral support for POCL. One study demonstrated moderate ability of POCL to predict severe illness. Two studies found poor agreement between prehospital POCL and serum lactate values. **Conclusion**: Limited low and moderate quality evidence suggest POCL may be feasible and helpful in predicting sepsis in the prehospital setting. However, there is sparse and inconsistent support for specific important outcomes, including accuracy.

Keywords: emergency medical services, point of care lactate, sepsis

P061

Post-market surveillance of a serious board game: the GridlockED experience

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Introduction: In 2016, a team at McMaster began developing GridlockED, an educational (or "serious") board game designed to teach medical learners about patient flow in the emergency department. As serious board games are a relatively new phenomenon in medical education, there is little data on how marketed games are actually used once received by end-users. In this study our goal was to better understand the demographics and game usage for purchasers of the GridlockED board game, which will inform the further improvement or expansion of the game. **Methods**: Individuals who expressed interest in purchasing gridlockED via our online storefront were sent an anonymous online survey via Google Form. The survey collected demographic and qualitative data with a focus on the respondent's role in medicine, how they have used GridlockED, who they have played GridlockED with, and what changes or additions to GridlockED they would like to see. We also asked about changes for a potential mass-market version of the game targeted towards non-medical individuals. Individuals who did not purchase the game were asked about their barriers to purchase. We received an exemption for this study from our institutional review board. **Results**: 42 responses (out of 300 individuals on our mailing list, 14% response rate) were collected. Responding purchasers were from 16 different roles in healthcare and 11 different countries. The top 5 roles were: EM trainee, Community EM MD, Academic EM MD, Physicians from other specialties, and EM program director. The majority of respondents were Canadian (38%), with America (21%), New Zealand (10%), and Turkey (7%) the only other countries to have more than 2 respondents. 50% reported having played the game, with the most common use cases being for fun (76%), for teaching trainees (33%) or training with colleagues (19%). For those who did not purchase, price was the largest barrier (81%). 50% of respondents expressed interest in a disaster scenario expansion pack, with 33% interested in set lesson plans. **Conclusion**: GridlockED attracted interest from a wide range of medical professionals, both in terms or role and location. Users mainly reported using the game for fun, with fewer users using the game for teaching/training purposes. The main barrier to purchase was the game's price.

Keywords: medical education, serious games

P062

Designing team success - an engineering approach to capture team procedural steps to develop microskills for interprofessional skills education

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Introduction: Chest tube insertion, a critical procedure with a published complication rate (30%), is a required competency for emergency physicians. Microskills training has been shown to identify steps that require deliberate practice. Objectives were: 1. Develop a chest tube insertion microskills checklist to facilitate IPE, 2. Compare the microskills checklist with published best available evidence, 3. Develop an educational video based on the process map, 4. Evaluate the video in an interprofessional team prior to cadaver training as a proof of concept. **Methods**: The study was conducted between March 2018 and November 2018. An initial list of process steps from the best available evidence was produced. This list was then augmented by multispecialty team consensus (3 Emergency Physicians, 1 Thoracic Surgeon, 1 medical student, 2 EM nurses). Two prototyping phases were conducted using a task trainer and a realistic interprofessional team (1 EM Physician, 1 ER Nurse, 1 Medical student). A final microskills list was produced and compared to the procedural steps described in consensus publications. An educational video was produced and evaluated by an interprofessional team prior to cadaver training using a survey and Likert scales as a proof of concept. Participants were 7 EM RNs and 6 ATLS trained physicians. Participants were asked to fill out a nine-question survey, using a 5-point Likert Scale (1-strongly disagree to 5 strongly agree). **Results**: The final process map contained 54 interdisciplinary steps, compared to ATLS that describes 14 main steps and peer reviewed articles that describe 9 main steps. The microskills checklist described, in more detail, the steps

that relate to team interaction and the operational environment. Physicians rated the training video were able to apply what they learned in the video with an average of 4.67 (median of 5, mode of 5, and an IQR of 0.75). **Conclusion**: The development of the process maps and microkills checklists provides interprofessional teams with more information about chest tube insertion than instructions described in commonly available courses and procedural steps derived by consensus.
Keywords: education, microskills checklist, process maps

P063
Identification of emergency department patients for referral to rapid-access addiction services: A retrospective chart review
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Introduction: Emergency Department (ED) visits related to substance use are rapidly increasing. Despite this, few Canadian EDs have immediate access to addiction medicine specialists or on-site addiction medicine clinics. This study characterized substance-related ED presentations to an urban tertiary care ED and assessed need for an on-site rapid-access addiction clinic (RAAC). **Methods**: This prospective enrollment, retrospective chart review was conducted from June to August 2018. Adult patients presenting to the ED with a known or suspected substance use disorder were enrolled by any member of their ED care team using a 1-page form. Retrospective chart review of the index ED visit was conducted and the Emergency Department Information System was used to extract information related to the visit. A multivariable logistic regression model was fit to examine factors associated with recommendation for referral to a hypothetical on-site RAAC.This prospective enrollment, retrospective chart review was conducted from June to August 2018. Adult patients presenting to the ED with a known or suspected substance use disorder were enrolled by any member of their ED care team using a 1-page form. Retrospective chart review of the index ED visit was conducted and the Emergency Department Information System was used to extract information related to the visit. A multivariable logistic regression model was fit to examine factors associated with recommendation for referral to a hypothetical on-site RAAC. **Results**: Of the 557 enrolment forms received, 458 were included in the analysis. 64% of included patients were male and 36% were female, with a median age of 35.0 years. Polysubstance use was seen in 23% of patients, and alcohol was the most common substance indicated (60%), followed by stimulants (32%) and opioids (16%). The median ED length of stay for included patients was 483 minutes, compared to 354 minutes for all-comers discharged from the ED during the study period. 28% of patients had a previous ED visit within 7 days of the index visit, and an additional 17% had a visit in the preceding 30 days. The ED care team indicated 'Yes' for RAAC referral from the ED for 66% of patients, for a mean of 4.3 patients referred per day during the study period. Multivariable analysis showed that all substances (except cannabis) correlated to a statistically significant increase in likelihood for indicating 'Yes' for RAAC referral from the ED (alcohol, stimulants, opioids, polysubstance; $p < 0.05$). Patients presenting to the ED with a chief complaint related to substance use were also more likely to be referred ($p = 0.01$). **Conclusion**: This retrospective chart review characterized substance-related presentations at a Canadian urban tertiary care ED. Approximately four patients per day would have been referred to an on-site RAAC had one been available. The RAAC model has been implemented in other Canadian hospitals, and collaborating with these sites to begin developing this service would be an important next step.
Keywords: addiction medicine, chart review, quality improvement

P064
A randomized trial comparing telephone tree, text messaging, and instant messaging app for emergency department staff recall for disaster response
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Introduction: A crucial component of a hospital's disaster plan is an efficient staff recall communication method. Many hospitals use a "calling tree" protocol to contact staff members and recall them to work. Alternative staff recall methods have been proposed and explored. **Methods**: An unannounced, multidisciplinary, randomized emergency department (ED) staff recall drill was conducted at night - when there is the greatest need for back-up personnel and staff is most difficult to reach. The drill was performed on December 14, 2017 at 4:00AM and involved ED staff members from three hospitals which are all part of the McGill University Health Centre (MUHC; Montreal, Quebec, Canada). Three tools were compared: manual phone tree, instant messaging application (IMA), and custom-made hospital Short Message Service (SMS) system. The key outcome measures were proportion of responses at 45 minutes and median response time. **Results**: One-hundred thirty-two participants were recruited. There were 44 participants in each group after randomization. In the manual phone tree group, 18 (41%) responded within 45 minutes. In the IMA group, 11 participants (25%) responded in the first 45 minutes. In the SMS group, seven participants responded in the first 45 minutes (16%). Manual phone tree was significantly better than SMS with an effect size of 25% (95% confidence interval for effect: 4.6% to 45.0%; $P = .018$). Conversely, there was no significant difference between manual phone tree and IMA with an effect size of 16% (95% confidence interval for effect: -5.7% to 38.0%; $P = .17$) There was a statistically significant difference in the median response time between the three groups with the phone tree group presenting the lowest median response time (8.5 minutes; range: 2.0 to 8.5 minutes; $P = .000006$). **Conclusion**: Both the phone tree and IMA groups had a significantly higher response rate than the SMS group. There was no significant difference between the proportion of responses at 45 minutes in the phone tree and the IMA arms. This study suggests that an IMA may be a viable alternative to the traditional phone tree method. Limitations of the study include volunteer bias and the fact that there was only one communication drill, which did not allow staff members randomized to the IMA and SMS groups to fully get familiar with the new staff recall methods.
Keywords: disaster, staff recall

P065
Emergency department staff perceived need and preferred methods for communication skills training
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Introduction: Burnout includes emotional exhaustion (EE), depersonalization (DP) and personal accomplishment (PA). Emergency Department (ED) staff have high levels of burnout that may be

responsive to communication skills training. We surveyed ED staff perception of need and efficacy before and after an intervention using an established conflict resolution methodology. **Methods**: ED physicians, nurses and support staff were surveyed at two regional hospitals using the Maslach Burnout Inventory (MBI) and a communications questionnaire to establish the perceived need for communication skill training. Participants from one center were provided with a communications intervention (Crucial Conversations®, VitalSmarts®), and a refresher course 6-15 months later. The survey was then repeated at both sites and course participant feedback was elicited. **Results**: MBI results were high (mean EE = 25.25 (high > 25), 95% CI = 22.5-28; DP = 11.6 (high > 8), 95% CI = 10.1-13.2; PA = 35.85 (low <34), 95% CI = 34.3-37.4). Initially 82% of intervention and 77% of control site participants responded that "attending an educational session about ways to communicate better would help the participants at work". Post intervention group responses to "The program will be helpful to me in communicating more effectively in my work environment" were: 75% "strongly agree" and 25% "agree". No rating below "agree" was assigned by any of the participants. Participants preferred facilitated small group simulations and advocated for earlier career implementation. **Conclusion**: There was a perceived need for and impact from communication skills training for ED staff with high measured burnout. Training may be best implemented in small group simulated encounters and in health professional education curriculum or as part of work orientation.

Keywords: burnout, communication training, emergency department

P066

Ultrasound localization to resuscitate in arrest (ULTRA)

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Introduction: There is increasing evidence supporting ultrasonography for the determination of optimal chest compression location during cardiac arrest. Radiological studies have demonstrated that in up to 1/3 of patients the aortic root or outflow tract is being compressed during standard CPR. Out-of-hospital-cardiac-arrests (OHCA) could benefit from cardiac localization, undertaken with scaled-down ultrasound equipment by which the largest fluid filled structure in the chest (the heart) is identified to guide optimal compression location. We intend to evaluate 1) where the left ventricle is in supine patients, 2) the accuracy and precision as well as 3) the feasibility and reliability of cardiac localization with a scaled down ultrasound device (bladder scanners). **Methods**: We are recruiting men and women over the age of 40. The scanning protocol involves using a bladder scanner on a 15-point grid over the subject's left chest and parasternal, midclavicular, and anterior axillary intercostal spaces 3-7. Detected volumes will be recorded, with the presumption that the intercostal space with the largest measured volume is centered over the heart. Echocardiography will then be used to confirm the bladder scanner accuracy and to better describe the patient's internal chest anatomy. Having assessed procedural feasibility on 3 pilot subjects, we are now recruiting 100 participants, with planned interim analysis at 50 participants for sample size reassessment. Maximal volume location frequencies from the echocardiograms will be described and assessed for variation utilizing the goodness-of-fit test. The proportion of agreement across the two modalities regarding the maximal volume location will also be examined. **Results**: Among the 3 volunteers (pilot study), the scanner identified fluid in 4-8 of 15 intercostal spaces. In each of the three pilot study patients, the maximal volume identified by the bladder scanner was found to be at the parasternal location of the 6th intercostal space. This was also the location of the mid left ventricular diameter on echocardiography. **Conclusion**: Our literature review and pilot study data support the premise that lay persons and emergency medical personnel may improve compressions (and thus outcomes) during OHCA by using a scaled-down ultrasound to identify the location of optimal compression. We are currently enrolling patients in our study.

Keywords: pre-hospital, resuscitation, ultrasound

P067

The number and types of procedural skill acquired by family medicine/emergency medicine (CCFP-EM) residents at different teaching sites

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Introduction: During the one-year CCFP-EM program, residents rotate through different teaching sites. The purpose of this project is to investigate differences in procedural skills acquisition between these sites, which will help identify the effectiveness of each setting for teaching procedural skills amongst EM trainees. **Methods**: Over a two year period, residents enrolled in a CCFP-EM residency training program were asked to log their procedures and the sites where they were performed. The cumulative data was analyzed to show the number and types of procedures performed at each site. **Results**: A total of 477 procedures were logged over two years, with 198 procedures performed at urban tertiary emergency departments (EDs), 116 at community EDs, 87 at intensive care units (ICUs), 37 at urgent care centre, 24 in clinics, and 15 at other settings. Overall, 48 point of care ultrasounds, 75 vascular access procedures, 99 reduction/casting, 48 lumbar punctures, 29 procedural sedations, 125 minor surgical procedures, and 32 other procedures were performed. The majority of procedures were performed at the tertiary care urban ED, followed closely by community ED setting. The only exception was vascular access, which was performed most commonly in ICU settings. **Conclusion**: Our urban tertiary care ED setting provided the most learning opportunity for procedural skill acquisition, suggesting that having maximized time allocated in this setting is essential for EM learners to acquire procedural skills. One exception is that EM learners gain more vascular access training in ICUs.

Keywords: procedural skills, residency training, teaching sites

P068

Significance of asymptomatic oxygen desaturation in elderly ED patients: A pilot study

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Introduction: Pulse oximetry is a standard component of Emergency Department (ED) patient monitoring. Pulse oximetry measures peripheral capillary oxygen saturation (SpO2) levels and can be used to monitor cardiorespiratory conditions. The normal SpO2 level for adults is approximately 96%. Oxygen saturations of <92% are considered problematic and levels <90% may indicate cardiorespiratory disease. However, low oxygen saturations are often seen in elderly patients with comorbidities. This research investigated the

significance of hypoxia in asymptomatic older ED patients with no apparent acute illness. **Methods**: ED patients >75 years with a documented room air pulse oximetry reading <92% were eligible. Exclusion criteria included dyspnea, chest pain, SBP <100mmHg, HR >120 or <50; sustained tachypnea (RR > 20); acute cardiopulmonary conditions, delirium or acutely altered mentation. Eligible patients were separated into two groups: 1) Sustained hypoxia: two or more SpO2 readings <92% 2) Unsustained hypoxia: one SpO2 reading <92%. 30-day adverse events were tracked using a Sunrise Emergency Care record review. Adverse outcomes investigated included death, MI, CHF, PE, cardioversion, ICU admission, intubation, ED revisit or re-hospitalization. Patient characteristics studied were age, sex, arrival mode, triage complaint, CTAS level, pulse, BP, RR, weight, residence (independent, assisted living, facility), comorbidities, PHN, referral, disposition, and test results (CXR, troponin, ECG, CT). Follow-up phone calls were completed after 30 days to assess patient status and confirm ED revisit. **Results**: A total of 876 ED patients >75 years were screened and 30-day follow-up data was analyzed for 34 enrolled patients. The sustained hypoxia group (n = 23) showed higher rates of 30-day adverse outcomes of death, ED re-visitation, MI, CHF, a severe episode of COPD, PE and ICU stays compared to the unsustained hypoxia group (n = 11). Administrative data of 31,095 patients >75 years from four Calgary EDs in 2017 was also analyzed and 7,771 (20%) were hypoxic at triage (SpO2 <92%). Adverse outcomes and mortality were significant in discharged hypoxic patients (especially if SpO2 <90%). **Conclusion**: ED re-visits, cardiorespiratory complications, and mortality were significant in discharged sustained hypoxic patients, especially if O2 sat <90%. Pulse oximetry assessment of oxygen saturation in seniors' care facilities and physicians' offices may be important in screening for future adverse health outcomes in elderly patients.

Keywords: geriatrics, hypoxia, pulse oximetry

P069

Does specialist referral influence emergency department return rate for patients with renal colic? A retrospective cohort study

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Introduction: Renal colic is a common presentation which exerts a significant burden on healthcare infrastructure. A significant proportion of patients managed with observation may return to the Emergency Department (ED) prior to spontaneous passage due to inadequate analgesia. It is unclear whether early urologist consultation would limit the burden of renal stones by reducing returns to the ED. We wished to determine whether urologist referral from the ED department is associated with fewer returns to the ED with renal colic. **Methods**: We conducted a retrospective chart review using RECORD methodology of consecutive patients diagnosed with CT-confirmed, ureteric or renal calculi in our ED over a two-year period. Disposition was categorized as either hospital admission, outpatient urologist referral, follow up with primary care, or no follow up. The primary outcome was the 30-day ED re-presentation for renal colic. Multivariate logistic regression was used to identify predictors for ED-return. **Results**: In total, 232 patients met our inclusion criteria. Urgent or outpatient urologist referral was not associated with a significantly lower ED return rate when compared to patients with no follow-up. Surprisingly, urologic intervention and stent placement were both independent predictors for ED return (OR: 2.03; 95% CI: (1.06-3.88); p:0.03) and (OR:2.08; 95% CI: (1.07-4.05). **Conclusion**: A significant proportion of patients who underwent urologist-led intervention returned to the ED with renal colic. Further study may help clarify the role of early urologist referral for renal calculi, as this may not reduce ED return rates when compared to conservative management.

Keywords: emergency department, renal colic, specialist referral

P070

Mental health consultations for emergency department patients in crisis: Insights into quality improvement opportunities from a multicenter analysis

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Introduction: Mental health and addiction presentations are on the increase in Canadian Emergency Departments (EDs) and are placing strains on existing resources. The purpose of this study is to examine practice variations and opportunities for improved mental health (MH) consultation practices across four adult EDs. **Methods**: We conducted a retrospective analysis of administrative data from Alberta Health Services (AHS) at urban Calgary Zone EDs from 2015 to 2018 regarding MH consults requested and patients admitted to inpatient psych. Individual MD and overall referral rates as well as admission rates for patients consulted to MH were considered. Time of day and patient ETOH level were also examined as potential influencing factors. CEDIS codes were used to identify MH complaints. **Results**: 73,536 MH related visits were included, 29,228 received a MH consult with 10,648 admitted to an inpatient MH unit (36.4%). The admission rate among consults requested varied considerably among the 200 MDs who evaluated more than 50 patients with MH complaints; median 35.9%, IQR – 25.0 to 47.5. The average consultation rate for ETOH positive patients was 28.4% median 26.35%, IQR – 21.2 to 35.0% During regular working hours (08:00-17:00), there were 33,599 MH visits, 15,035 received a psych consult with 5,976 admitted to an inpatient MH unit. The admission rate among consults was 39.8%. For the remaining hours(17:01-07:59) there were 39,939 MH visits, 14,191 received a psych consult with 4,672 admitted to an inpatient MH unit. The admission rate among consults was 32.9%. **Conclusion**: Varying MD thresholds for MH consultation are reflected in a wide range of admission rates among patients consulted for MH evaluation in the ED. ETOH and timing of presentation are factors which modulate the likelihood of admission. There may be opportunities to improve MH referrals from the ED by providing consultation feedback to providers.

Keywords: quality improvement and patient safety

P071

A three-year analysis of adult protection patients in the emergency department

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Introduction: While boarding of patients in the emergency department (ED) has been well documented and is carefully monitored, the time spent in emergency beds by patients waiting for Adult Protection (AP) placement is often relatively unnoticed, as they are not flagged as 'admitted'. These patients have no emergency needs, yet consume considerable ED resources, often in excess of patients requiring emergency care. Staff familiarity with this issue may also

bias them to premature diagnostic closure of patients as 'placement problems', risking misdiagnosis of active medical conditions. An observational study to retrospectively quantify the time spent in the ED by patients referred to AP services for urgent placement from the ED. **Methods**: A three-year audit of ED social work records of patients referred for AP. **Results**: For the period of October 1 2015-September 30, 2018, the ED social work service kept records of patients referred for AP from the ED. During this period, a total of 142 patients were referred to AP (40, 50, and 52 in each year respectively). There was an increase of 10 patients between 2015/16 and 2016/17 and two patients from 2016/17 to 2017/18. The overall length of stay for this subset of ED patients during this three-year period was alarmingly high, with an average length of stay of four days per patient (range 2.7 hours-18.5 days) compared to an average of all patients of 4.9 hours and admitted patients of 13.6 hours. **Conclusion**: Patients in the ED who are referred to AP services consume considerable ED resources, often requiring complete medical work-up, capacity assessments and close monitoring by multiple emergency personnel. This has been reported to cause considerable stress and friction between staff and consulting services. Furthermore, these patients are poorly served in a hectic, brightly lit, and noisy environment. The impact is often not fully appreciated due to ineffective capture by patient tracking systems.

Keywords: adult protection, emergency department flow, quality improvement and patient safety

P072

Comparing met vs. unmet palliative care needs in patients with end-stage conditions presenting to two Canadian emergency departments

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Introduction: Patients with end-stage conditions require integrated physical, spiritual, psychological and social care. Despite efforts to provide comprehensive community care, those with severe symptoms often present to emergency departments (EDs) with palliative care (PC) needs. The objective of this study was to identify patients with end-stage diagnoses presenting to EDs, and to document and compare their PC needs. **Methods**: A four-month prospective cohort study was conducted in two Canadian EDs. Using a modified PC screening tool, volunteer emergency physicians identified adult patients with end-stage illnesses and documented their PC needs. This tool has the ability to classify patients as having met vs. unmet PC needs based on the documentation of risk factors. Research assistants documented demographic information, severity at presentation (Canadian Triage and Acuity Scale {CTAS}), disposition and revisits from an electronic repository. Bivariate comparisons between patients with met vs. unmet PC needs were completed. **Results**: Overall, 663 patients were enrolled, of which 78% (n = 518/663) were identified as having unmet PC needs according to the screening tool. Cancer was the most prevalent condition in each group (43% unmet needs, 37% met needs). There was no significant difference between the two groups in terms of age, sex or CTAS score. The unmet PC needs group was more likely to be admitted (68% vs. 50%; p = 0.0001) when compared to patients with PC needs assessed as being met. No significant difference was noted in terms of time to physician assessment or ED length of stay. The two groups did not significantly differ in the proportion of return visits within 30 days (34% vs. 32%) or the average number of return visits (3 vs. 2 visits). A higher proportion of patients with unmet PC needs made at least one visit to the ED in the 6 months prior to their index visit compared to patients with met PC needs (74% vs. 51%, p < 0.001); yet, the average number of ED visits was similar between the groups (3 visits). **Conclusion**: This study revealed that patients with end-stage diagnoses, especially cancer, commonly have unmet PC needs. They are also more likely to present to the ED and to require hospitalization than patients in whom PC needs have been met. Further investigations into their clinical profile and health care utilization may clarify the impact of their unmet PC needs on the healthcare system.

Keywords: palliative care, unmet needs

P073

Consultations in the emergency department: a systematic review

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Introduction: While consultation is a common and important aspect of emergency department (ED) care, a previous systematic review identified significant utilization and process variation across ED's. The aim of this review update was to examine the proportion of the patients undergoing consultation in the ED among recent studies. **Methods**: Eight primary literature databases and the grey literature were searched. Studies published from 2007 to 2018 focusing on all-comers to the ED and reporting a consultation-related outcome were included. Disease- and specialty-specific studies were not eligible. Two independent reviewers screened studies for relevance, inclusion, quality assessment, and data extraction. Disagreements were resolved through consensus. Means, medians and interquartile ranges are reported. Wilcoxon-rank sum test and one-way ANOVA were used to identify differences between groups, as appropriate. **Results**: A total of 2632 unique citations and 49 studies from the grey literature were screened, of which 29 primary studies were included. Fifteen studies reported on the proportion of ED patients undergoing consultation, involving EDs in the Middle East (n = 4), North America (n = 4), Asia (n = 4), and Europe (n = 3). Overall, the proportion of patients receiving consultation ranged from 7% to 78% (median: 26%; IQR: 20%, 38%). There were no differences in the proportions of consulted patients based on country of origin. Ten studies were conducted prior to 2013, while five studies recruited patients during and after 2013. The mean proportion of consulted patients was lower for post-2012 studies compared to pre-2012 studies (mean: 18% vs. 36%; p = 0.0048). The proportion of consulted patients admitted to hospital ranged considerably between the 14 reporting studies (median: 56%; IQR: 49%, 76%). No differences in the proportion of admitted patients undergoing a consult were identified based on country of origin or year of recruitment for the study. **Conclusion**: Although consultation utilization appears to be decreasing overall, there is considerable practice variation in EDs around the world. These differences may result from variation in patient acuity, case-load, staffing levels, institutional and health-system organization, and medical training and future research should explore reasons for these differences.

Keywords: admission, consultation, systematic review

P074

Improving urology care in the emergency department through implementation of an Acute Care Urology model

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Introduction: Renal colic is one of the most common presentations to the emergency department (ED), and often requires complex interdisciplinary collaboration between emergency physicians and urology surgeons. Previous literature has shown that adoption of interdisciplinary rapid referral clinics can improve both timeliness of care and patient outcomes. However, these Acute Care Surgery models have not yet been commonly adopted for urology care in the ED. **Methods**: In July 2016, we adopted the intervention of an Acute Care Urology (ACU) model through the creation of a rapid referral clinic dedicated to ED patient referrals, the addition of an ACU surgeon, and enhanced use of daytime OR blocks. We conducted a manual chart review of 579 patients presenting to the ED with a complaint of renal colic. Patient data was collected in two separate time periods to analyze trends before implementation of the ACU model (pre-intervention, September - November 2015), to examine the model's impact (post-intervention, September - November 2016). Secondary methods of evaluation included a survey of 20 ED physicians to capture subjective feedback through Likert scale data. **Results**: Of the evaluated 579 patients with a complaint of renal colic,194 patients were discharged from ED with an diagnosis of obstructing kidney stone and were referred to urology for outpatient care. The ED-to-clinic time was significantly lower for those in the ACU model ($p < 0.001$). The mean time to clinic was 15.76 days (SD = 15.47, range 1-93) pre-intervention versus 4.17 days (SD = 2.33, range = 1-12) post-intervention. Furthermore, the ACU clinic allowed significantly more patients to be referred for outpatient care ($p = 0.0004$). There was also higher likelihood that patients would successfully obtain an appointment following referral ($p = 0.0055$). Decreasing trends were shown in mean ED wait time, in addition to time from assessment to procedure. Results of the qualitative survey were overwhelmingly positive. All 20 surveyed ED physicians were more confident that outpatients would be seen in a timely manner (85% strongly agree, 15% agree). Qualitative feedback included the belief that follow-up is more accessible, that ED physicians are less likely to page the on-call urologist, and that they are able to discharge patients sooner. **Conclusion**: The ACU model for patients with renal colic may be beneficial in reducing ED-to-clinic time, ensuring proper follow-up after ED diagnosis, and improving patient care within the ED.

Keywords: colic, renal, urology

P075

Emergency physicians' self-reported management of benign headache in Alberta emergency departments

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Introduction: Benign headache (BHA) management varies across emergency departments (EDs). This study documented current BHA management by Alberta emergency physicians (EP) in order to develop a provincial intervention to improve standardized practice. **Methods**: A convenience sample of Alberta EPs completed an online survey exploring their ED BHA management practices. Results are expressed as proportions. **Results**: A total of 73 EPs (73/192; 38%) who were mostly male (63%) and practiced emergency medicine for at least 15 years (51%) responded. EPs reported routine ED orders for metoclopramide (97%), ketorolac (90%) and IV fluids (85%) for patients with BHA showing no signs of pathological headache. For moderate-severe BHA's that did not improve with routine treatment, preferences were: IV narcotic (58%), IV dexamethasone (44%), and IV/IM dihydroergotamine (27%). Typically, EPs reported not ordering investigations for moderate-severe BHA presentations (88%); however, for those not improving the most common investigation was computed tomography (CT; 47%). CT ordering was associated with the following clinical scenarios: 1) not responding to traditional therapy and consulted to specialist (64%); 2) not responding to traditional therapy and being admitted (64%); 3) first presentation and afebrile (19%); 4) severe pain (11%); and 5) responding to traditional therapy and febrile (11%). One-quarter of EPs (27%) believed their patients usually or frequently expected a CT. Most EPs (60%) reported being completely or mostly comfortable discussing CT risks. Only 44% reported always or usually discussing risks prior to ordering. EPs reported that they were most frequently prevented from discussing risks because the patient was critically ill (42%) or because they believed explaining risks would not alter patient expectations (21%). These concerns were mirrored in the barriers EPs anticipated to limiting imaging, specifically the fear of missing a severe condition (62%), and patient expectation/request for imaging (48%). **Conclusion**: Self-reported treatment preferences for uncomplicated BHAs appear to be relatively consistent. Chart reviews could help assessing the reliability of self-reported BHA management practices. Perceived patient expectation appears to be an important influence on EP imaging ordering. Studies examining the communication between EPs and their patients are needed to explore how these expectations and perceived expectations are negotiated in the ED.

Keywords: benign headache, computed tomography, emergency department

P076

Do QR codes effectively engage patients in research while visiting the emergency department?

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Introduction: Efforts to engage patients in research when presenting to emergency departments (EDs) have explored the utility of online tools; for example, through QR-based applications. It is unclear whether these are effective strategies for engaging patients in research activities while saving costs of in-person surveys. This study evaluated whether patients would participate in QR codes or short URL-linked surveys available in EDs across Alberta. **Methods**: A patient waiting room poster was developed as part of a stepped-wedge randomized controlled trial. The waiting room poster was introduced in 15 urban and regional Alberta EDs with a median annual volume of approximately 60,000. A QR-code and short URL were placed on the poster inviting patients to participate in an online survey and evaluate the poster's usefulness and acceptability. Additionally, written discharge instructions, which were part of the intervention materials, were distributed with QR-code and short URL link to surveys for patients to share their ED care experience. Patients were not

prompted by any staff or research personnel to encourage use of the QR codes or the short URLs; however, a survey was conducted with ED waiting room patients in 3 urban EDs to ascertain whether they had downloaded a QR reader on their devices and the frequency of use of these applications. **Results**: Given the stepped-wedge nature of the study, these materials were available for a total of approximately 123 months (3 sites for 13 months, 4 sites for 10 months, 4 sites for 7 months, and 4 sites for 4 months). Over the study period, 15 patients accessed and completed the online survey linked to the QR code or the short URL placed on the posters. No patients completed the online surveys linked to the QR code or the short URL placed on the discharge instructions. The in-person survey conducted within the ED waiting room identified that 34% of respondents had a QR code reader downloaded on their phone (108/316). Of those with a QR reader, 33% reported using the reader at least once within the last 6 months. **Conclusion**: In this study, few patients downloaded QR readers on their electronic devices while in the ED waiting room. Without prompting, this appears to be an ineffective strategy for engaging patients in emergency medicine research. Other engagement strategies optimizing human resource investment are urgently needed to effectively conduct research in EDs.

Keywords: emergency research, patient engagement

P077

Piloting imaging-focused knowledge dissemination tools in Alberta emergency departments

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Introduction: Variation in image ordering exists across Alberta emergency departments (EDs). Evidence-based, pocket-sized knowledge dissemination tools were developed for two conditions (acute asthma [AA] and benign headache [BHA]) for which imaging (chest x-ray [CXR] and computed tomography [CT], respectively) has limited utility. This study explored tool acceptability among ED patients and emergency physicians (EPs). **Methods**: Tool feedback was provided by EPs, via online survey, and adult patients with AA and BHA via in-person survey. EPs qualitative interviews further explored communication tools. Preliminary descriptive analyses of survey responses and content analysis of interview data were conducted. **Results**: Overall, 55 EPs (55/192; 29%) and 38 consecutive patients participated in the AA study; 73 EPs (73/192; 38%) and 160 patients participated in the BHA study. In both studies, approximately 50% of EPs felt comfortable using the tool; however, they suggested including radiation risk details and imaging indications and removing references to imaging variation and health system cost. In the BHA study, EPs opposed the four Choosing Wisely® campaign questions fearing they would increase imaging expectations. In both conditions, most patients (>90%) understood the content and 68% felt the information applied to them. Less than half (AA:45%; BHA: 38%) agreed that they now knew more about when a patient should have imaging workup done. Following tool review, 71% of AA and 50% of BHA patients stated they would discuss their imaging needs with their ED care provider today or during a future presentation. Both patient groups suggested including: additional imaging details (i.e., indications, risk, clinical utility), removing imaging overuse references, and including instructions that encourage patients to ask their EP questions. EP interviews (n = 12) identified preferences for personalized and interactive tools. Tensions were perceived around ED time pressure as well as remuneration schemes that fail to prioritize patient conversation. Tool centralization, easy access, and connection with outpatient support were also key themes. **Conclusion**: Both patients and EPs provided valuable information on how to improve ED knowledge dissemination tools, using two chronic conditions to demonstrate how these changes would improve tool utility. Implementing these recommendations, and considering preferences of EPs and patients, may improve future tool uptake and impact.

Keywords: diagnostic imaging, knowledge dissemination, patient education

P078

An environmental scan of quality improvement and patient safety activities in emergency medicine in Canada

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Introduction: Quality improvement and patient safety (QIPS) activities in healthcare have become increasingly important, but it is unclear what the current national landscape is with regards to how individual EM departments are supporting QIPS activities and evaluating their success and sustainability. We sought to assess how Canadian medical school EM departments/divisions and major Canadian teaching hospitals approach QIPS programs and efforts, with regards to training, available infrastructure, education, scholarly activities, and perceived needs. **Methods**: We developed 2 electronic surveys through expert panel consensus to assess important themes identified by the CAEP QIPS Committee, including a)formal training/skill capacity; b)operational infrastructure; c)educational activities; d)academic and scholarship, and e)perceived gaps and needs. Surveys were pilot-tested and revised by authors. "Survey 1" (21 questions) was sent by email to all 17 Canadian medical school affiliated EM Department Chairs and Academic Hospitals Department Chiefs; "Survey 2" (33 questions) to 11 identified local QIPS leads in these hospitals. This was followed by 2 monthly email reminders to participate in the survey. We present descriptive statistics including proportions, means, medians and ranges where appropriate. **Results**: 22/70 (31.4%) Department Chairs/Chiefs completed Survey 1. Most (81.8%) reported formal positions dedicated to QIPS activities within their groups, with a mixed funding model. Less than half of these positions have dedicated logistical support. 11/12 (91.7%) local QIPS leads completed Survey 2. Two-thirds (63.6%) reported explicit QIPS topics within residency curricula, but only 9.1% described QIPS training for staff physicians. 45% of respondents described successful academic scholarship output, with the total number of peer-reviewed QIPS-related publications per center ranging from 1-10 over the past 5 years. A minority of participants reported access to academic supports: methodologists (27.3%), administrative personnel (27.3%), and statisticians (9.1%). **Conclusion**: This environmental scan provides a snapshot of QIPS activities in EM across academic centers in Canada. We found significant local educational and academic efforts, although there is a discrepancy between the level of formal support/infrastructure and such activities. There remains opportunity to further advance QIPS efforts on a national level, as well as advocating and supporting local QIPS activities.

Keywords: patient safety, quality improvement

P079

A retrospective cohort study of the impact of age and post-intubation hypotension threshold on mortality

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Introduction: Endotracheal intubation (EI) is frequently performed in the emergency department (ED). Although this procedure is generally life-saving, EI is also known to cause adverse effects, such as hemodynamic alterations. A systolic blood pressure <90 mmHg is the most commonly accepted definition of hypotension; however systolic blood pressure naturally increases with age. The National Trauma Triage Protocol now states that this threshold could be raised to 110 mmHg in older patients. **Objective**: to determine the impact of increasing the post-intubation hypotension (PIH) threshold to 110 mmHg on hospital length of stay and mortality in older patients. **Methods**: Design: A historical cohort of patients admitted in a level-1 trauma center ED between 06/2011 and 05/2016 was constituted. **Population**: Patients were included if pre-EI vital signs were available, their intubation was performed in the resuscitation room, were aged ≥65, if no surgical access was needed and if EI was performed in ≤3 attempts. **Measures**: All clinical data including vitals were prospectively recorded using the software ReaScribe. Main outcome was in-hospital mortality. **Analyses**: Univariate and multivariate analyses assessed the relation between PHI and outcomes. **Results**: A total of 181 patients were included. When using the 90-mmHg threshold, 92 patients suffered from PIH. Mean length of stay for these PIH patients was 18.9 days, compared to 12.0 days for non-hypotensive patients (P = 0.06). Mortality rate at 24 hours was 9.78% and 15.83% for PIH and non PIH patients, respectively (p = 0.2). The 110-mmHg threshold identified 33 additional PIH patients (n = 125) and their mean length of stay was 17.8 compared to 10.2 days for non PIH patients (P = 0.02). Mortality rate at 24 hours was 9.90% for PIH patients and 21.43% for non PIH patients (p = 0.02). **Conclusion**: PIH was associated with a significant increase in LOS when the PIH threshold is set at 110. Mortality rate is high in the intubated ED older patient and that increasing hypotension threshold for older patient seem to have no impact on patient mortality at 24 hours. Since our sample is limited, more research is needed to confirm these results.

Keywords: geriatric, hypotension, intubation

P080

What is the impact of post-intubation hypotension on mortality and in-hospital length of stay?

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Introduction: Hypotension is known to severely impact the prognosis of patients in need of acute care. Endotracheal intubation (EI) is a procedure that is often used in the emergency room for patients with severe conditions. Post-intubation hypotension (PHI) is a well-known adverse effect of EI, although the impact of PHI on mortality is still unclear. The objective of this study was therefore to evaluate the association between post-intubation hypotension (PIH) and in-hospital mortality rates and length of stay (LOS). **Methods**: Design: A historical cohort of patients admitted in a university-affiliated emergency department (ED) between 06/2011 and 05/2016 was constituted. **Population**: Patients aged ≥16 were included if pre-EI vital signs were available, if their intubation was performed in the resuscitation room, if no surgical access was needed and if EI was performed in ≤3 attempts. **Measures**: All clinical data including vitals were prospectively recorded using the software ReaScribe. Hypotension was defined as a systolic blood pressure ≤90 mmHg. The occurrence of PIH was assessed at 5, 15, 30 minutes and any time after intubation. Main outcomes were in-hospital mortality and hospital length of stay. **Analyses**: Univariate and multivariate analyses assessed the relation between PHI and outcomes. **Results**: A total of 497 patients were included in our analyses. Of these patients, 63 (12.7%) suffered from PIH at 5 minutes, 120 (24,1%) at 15 minutes, 168 (33,8%) at 30 minutes and 209 (42%) at any moment after intubation. Mortality rates were 42.9% (n = 27), 35.8% (n = 43), 33.9% (n = 57) and 30.6%(n = 64) for patients who presented PIH at the 4 time periods, respectively, while 26.74% patients died in the normotensive group. PIH at 5 (p = 0.006), 15 (p = 0.04) and 30 minutes (p = 0.05) was associated with a significant increase in overall post-intubation mortality. Mean LOS for patients who suffered from PIH was 16.7, 18.9, 17.3, 17.4 days compared to 19.5 (p = 0.22) days for the normotensive group. **Conclusion**: Early post-intubation hypotension at 5 minutes was strongly associated with an increased mortality. As for the in-hospital length of stay, PIH was not associated with an increased LOS. Our results show that PIH within 30 minutes of intubation is associated with an increased mortality rate and should therefore be aggressively treated or prevented.

Keywords: hypotension, intubation, mortality

P081

Distribution of take home naloxone in Edmonton zone emergency departments between January 2016 and December 2017

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Introduction: Morbidity and mortality from opioid overdoses continue to be a significant issue worldwide. In Alberta, there was a 40% increase in accidental opioid-related deaths from 2016 to 2017. In response to this crisis, Alberta Health Services has dramatically expanded access to Naloxone with a province-wide program for the distribution of take-home naloxone (THN) kits. Edmonton Zone ED's began dispensing these kits in 2016. The objectives of this study are to assess the trends in THN kit distribution from these sites in 2016 and 2017. **Methods**: The Edmonton Zone is a health region that comprises eleven tertiary, urban community and rural community ED's. THN kits in Edmonton Zone ED's were distributed through Pyxis, an automated medication dispensing and tracking system. Pyxis data for THN kits in 2016 and 2017 was extracted for each Edmonton Zone ED and the raw numbers and trends were examined. The National Ambulatory Care Reporting System database was also analyzed to determine the number of opioid related visits to Edmonton Zone ED's over that same time period. **Results**: A total of 686 THN kits in the Edmonton Zone were distributed over 2016 and 2017. The two tertiary centers distributed 502 kits, while the urban and rural community emergency departments collectively distributed 184 kits. Comparing 2016 (n = 245) to 2017 (n = 441), there was an 80% overall increase in the number of kits distributed, with tertiary center ED's dispensing 92% more kits, urban community ED's 51% more and rural ED's 63% more. Over the same time period, the number of opioid related visits increased in tertiary center ED's by 78%, in urban community sites by 26%, and in rural ED's by

67%. Almost all ED's increased their THN kit distribution from year to year, though there was one urban community site that dispensed fewer kits in the second year of the program. **Conclusion**: Edmonton Zone ED's dispensed 686 THN kits over two calendar years. Almost every ED distributed more kits in 2017 than 2016, which likely reflects successful uptake of this harm reduction intervention by frontline ED staff. However, there is still evidence of some imbalance in THN kit allocation as the percent increase in kits distributed varied widely based on the type of ED. This data can be used to pinpoint areas in the Edmonton Zone where barriers to THN access may still exist and guide continued quality improvement interventions to increase distribution and education.

Keywords: take home naloxone, opioid, overdose

P082

Predictive ability of the quick Sepsis-related Organ Failure Assessment score among patients with infection transported by paramedics: a Bayesian analysis

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Introduction: The quick Sepsis-related Organ Failure Assessment (qSOFA) score was developed to provide clinicians with a quick assessment for patients with latent organ failure possibly consistent with sepsis at high-risk for mortality. With the clinical heterogeneity of patients presenting with sepsis, a Bayesian validation approach may provide a better understanding of its clinical utility. This study used a Bayesian analysis to assess the prediction of hospital mortality by the qSOFA score among patients with infection transported by paramedics. **Methods**: A one-year cohort of adult patients transported by paramedics in a large, provincial EMS system was linked to Emergency Department (ED) and hospital administrative databases, then restricted to those patients with an ED diagnosed infection. A Bayesian binomial regression model was constructed using Hamiltonian Markov-Chain Monte-Carlo sampling, normal priors for each parameter, the calculated score, age and sex as the predictors, and hospital mortality as the outcome. Discrimination was assessed using posterior predictions to calculate a "Bayesian" C statistic, and calibration was assessed with calibration plots of the observed and predicted probability distributions. The independent predictive ability of each measure was tested by including each component measure (respiratory rate, Glasgow Coma Scale, and systolic blood pressure) as continuous predictors in a second model. **Results**: A total of 9,920 patients with ED diagnosed infection were included. 264 (2.7%) patients were admitted directly to the ICU, and 955 (9.6%) patients died in-hospital. As independent predictors, the probability of mortality increased as each measure became more extreme, with the Glasgow Coma Scale predicting the greatest change in mortality risk from a high to low score; however, no dramatic change in the probability supporting a single decision threshold was seen for any measure. For the calculated score, the C statistic for predicting mortality was 0.728. The calibration curve had no overlap of predictions, with a probability of 0.5 (50% credible interval 0.47-0.53) for patients with a qSOFA score of 3. **Conclusion**: Although no single decision threshold was identified for each component measure, a calculated qSOFA score provides good prediction of mortality for patients with ED diagnosed infection. When validating clinical prediction scores, a Bayesian approach may be used to assess probabilities of interest for clinicians to support better clinical decision making. Character count 2494

Keywords: Bayesian analysis, prediction, sepsis

P083

Innovative use of AED by RNs and RTs during in-hospital cardiac arrest (Phase III)

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Introduction: In-hospital cardiac arrest (IHCA) most commonly occurs in non-monitored areas, where we observed a 10min delay before defibrillation (Phase I). Nurses (RNs) and respiratory therapists (RTs) cannot legally use Automated External Defibrillators (AEDs) during IHCA without a medical directive. We sought to evaluate IHCA outcomes following usual implementation (Phase II) vs. a Theory-Based educational program (Phase III) allowing RNs and RTs to use AEDs during IHCA. **Methods**: We completed a pragmatic before-after study of consecutive IHCA. We used ICD-10 codes to identify potentially eligible cases and included IHCA cases for which resuscitation was attempted. We obtained consensus on all data definitions before initiation of standardized-piloted data extraction by trained investigators. Phase I (Jan.2012-Aug.2013) consisted of baseline data. We implemented the AED medical directive in Phase II (Sept.2013-Aug.2016) using usual implementation strategies. In Phase III (Sept.2016-Dec.2017) we added an educational video informed by key constructs from a Theory of Planned Behavior survey. We report univariate comparisons of Utstein IHCA outcomes using 95% confidence intervals (CI). **Results**: There were 753 IHCA for which resuscitation was attempted with the following similar characteristics (Phase I n = 195; II n = 372; III n = 186): median age 68, 60.0% male, 79.3% witnessed, 29.7% non-monitored medical ward, 23.9% cardiac cause, 47.9% initial rhythm of pulseless electrical activity and 27.2% ventricular fibrillation/tachycardia (VF/VT). Comparing Phases I, II and III: an AED was used 0 times (0.0%), 21 times (5.6%), 15 times (8.1%); time to 1st rhythm analysis was 6min, 3min, 1min; and time to 1st shock was 10min, 10min and 7min. Comparing Phases I and III: time to 1st shock decreased by 3min (95%CI -7; 1), sustained ROSC increased from 29.7% to 33.3% (AD3.6%; 95%CI -10.8; 17.8), and survival to discharge increased from 24.6% to 25.8% (AD1.2%; 95%CI -7.5; 9.9). In the VF/VT subgroup, time to first shock decreased from 9 to 3 min (AD-6min; 95%CI -12; 0) and survival increased from 23.1% to 38.7% (AD15.6%; 95%CI -4.3; 35.4). **Conclusion**: The implementation of a medical directive allowing for AED use by RNs and RRTs successfully improved key outcomes for IHCA victims, particularly following the Theory-Based education video. The expansion of this project to other hospitals and health care professionals could significantly impact survival for VF/VT patients.

Keywords: automated external defibrillator, cardiac arrest

P084

The sky is not the limit! Protocol for a rapid systematic review on the use of drones in emergency medicine

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Introduction: Drones are already being used in medicine. They are employed to transport blood products and laboratory samples in rural and remote areas and they are increasingly being tested to deliver external defibrillators outside the hospital to patients with cardiac

arrest. As this technology rapidly develops and attracts the attention of the scientific community, we present a rapid systematic review protocol that aims to synthesize the scientific evidence that has tested the use of drones to provide emergency medical care. **Methods**: A search strategy incorporating the concepts of 'drone' and 'emergency medicine' was launched in 52 bibliographic databases, including CINAHL and PubMed. Using the artificial intelligence module included in DistillerSR, a reviewer completed the first screening phase by reading the title and abstract of the retrieved articles. To be included, articles had to report empirical research projects that tested the potential uses of drones to improve the quality and accessibility of emergency medical care. These selection criteria were applied to the full text of the included articles during the second screening phase by a single reviewer. The results of these two screening phases will be validated by a second independent reviewer. The bibliography of included studies, relevant scientific journals and literature reviews will be manually searched for relevant articles. **Results**: The search strategy retrieved 1809 articles, of which 22 met our inclusion criteria in the first and second screening phases. Of these, one study used an empirical research design (qualitative interviews) to evaluate the usefulness of drones in emergency medicine, 17 used simulations or scenarios, and four were comprehensive literature reviews on the use of drones to provide healthcare. The final review will synthesize evidence related to the use of drones in emergency medicine and its impact on emergency medical services: nature of the emergency situation (cardiac arrest, blood transfusion), type of drone (fixed wing, quadcopter), tasks performed by drones (transport, surveillance), improvement in access or quality of care (patient's health, time saved in providing services). **Conclusion**: Drone technology is evolving rapidly and the indications for its use in providing emergency care is increasing. This rapid systematic review will focus on scientific studies aimed at testing the effectiveness of drones to improve the quality and access to emergency medical care.

Keywords: drones, emergency medicine, review protocol

P085

What do community paramedics assess? An environmental scan and content analysis of patient assessment in community paramedicine

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Introduction: Patient assessment is a fundamental feature of non-emergency community paramedicine (CP) home visit programs. In the absence of a recognized standard for CP assessment, current assessment practices in CP programs are unknown. Without knowing what community paramedics are assessing, it is difficult to ascertain what should be included in patient care plans, whether interventions are beneficial, or whether paramedics are meeting program objectives. Our objective was to summarize the content of assessment instruments used in CP programs in order to describe the state of current practice. **Methods**: We performed an environmental scan of all CP programs in Ontario, Canada, and employed content analysis to describe current assessment practices in CP home visit programs. The International Classification on Functioning, Disability, and Health (ICF) was used to categorize and compare assessments. Each item within each assessment form was classified according to the ICF taxonomy. Findings were compared at the domain and sub-domain of the ICF. **Results**: Of 54 paramedic services in Ontario, 43 responded to our request for information. Of 24 services with CP home visit programs, 18 provided their intake assessment forms for content analysis. Assessment forms contained between 13 and 252 assessment items (median 116.5, IQR 134.5). Overall, most assessments included some content from each of the domains outlined in the ICF, including: Impairments of Body Functions, Impairments of Body Structures, Activity Limitation and Participation, and Environmental Factors. At the sub-domain level, only assessment of Impairments of the Functions of the Cardiovascular, Haematological, Immunological and Respiratory systems appeared in all assessments. Few CP home visit program assessments covered most ICF sub-domain categories and many items classified to specific categories were included in only a few assessments. **Conclusion**: CP home visit programs complete multi-domain assessments as part of patient intake. The content of CP assessments varied across Ontario, which suggests that care planning and resources may not be consistent. Current work on practice guidelines and paramedic training can build from descriptions of assessment practices to improve quality of care and patient safety. By identifying what community paramedics assess, evaluation of the quality of CP home visit programs and their ability to meet program objectives can be improved and benchmarks in patient care can be established.

Keywords: community paramedicine, patient assessment, quality improvement and patient safety

P086

Awareness and barriers to access of a Ministry of Health mandated 'Do Not Resuscitate' confirmation form: An interim analysis

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Introduction: Elderly patients with comorbid illness have poor meaningful recovery after out of hospital cardiac arrest. Many elderly patients decide that if they have a cardiac arrest, they would want not want resuscitation. In Ontario, prehospital personnel must provide resuscitation to all patients regardless of previously stated wishes or legal documentation unless they are presented a Ministry of Health mandated 'Do Not Resuscitate' Confirmation Form (MOH-DNRCF). This study aimed to evaluate the awareness of this form as well as any barriers to its completion. **Methods**: Patients over 70 years of age presenting to the Emergency Department were approached to complete a short survey about their wishes regarding resuscitation, awareness of the MOH-DNRCF, as well as any barriers to completion. Standard demographic variables were also collected. Patients, with critical illness, with severe dementia, a language barrier or from a nursing home were excluded. The primary outcome was awareness of the MOH-DNRCF. Standard descriptive statistics were summarized using median [IQR] and simple proportions. **Results**: Preliminary data of 96 patients has been collected. The median [IQR] age of patients recruited was 81 [75-88] years and 54% were female. 49/96 (51%) have wishes to not be resuscitated in the event of cardiac arrest and of those 42 (86%) are not aware of the existence of the MOH-DNRCF. Of the 7 patients who were aware of the form only 1 had completed one. Barriers to completion included the patient being unsure where to access the form and difficulty in discussing the topic. **Conclusion**: The majority of patients with wishes to be DNR are unaware of the MOH-DNRCF. This has severe

repercussions as, in the event of an out of hospital cardiac arrest, these patients would be resuscitated by prehospital care providers. Strategies to increase awareness of the form as well as strategies to increase ease of access should be considered to avoid resuscitation that is against patient wishes.
Keywords: emergency medical service, resuscitation

P087

Pilot project: Implementation of a peer support network for geographically distributed learners in the NOSM family medicine/emergency medicine residency program

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Innovation Concept: Residents bear an enormous burden of responsibility for patient care which can lead to stress and mental exhaustion, especially in the face-paced and acute environment of emergency medicine (EM). In addition to numerous demands faced by EM residents, being a member of a geographically distributive residency program presents many unique challenges from a support and wellness perspective. To address these issues we sought to implement a video conferenced peer support network in hopes to foster wellness in the NOSM Family Medicine/EM program, where learners are commonly separated for training. **Methods**: Participants completed a pre-pilot questionnaire that strongly showed interest for this type of novel network. Furthermore residents conveyed that they are reluctant to access formal services and commonly rely on co-residents for support. This pilot program intends to decrease barriers that geography and stigma create that negatively hinder seeking support throughout medical training. Keeping the network small, consisting of only co-residents maintains a collegial and confidential environment that enables colleagues to provide relevant help to one another. Offering this outlet allows the opportunity to debrief and share unique experiences, which can lead to improved knowledge and wellbeing. **Curriculum, Tool or Material**: Informal, co-resident run and easy to access sessions are held twice monthly and average one hour in length. Discussion topics commonly include residency issues, difficult patient encounters and challenging situations. These sessions are conducted via video conferencing making them easily accessible from a distance and also from a comfortable and convenient environment of the participants choosing. Residents have commented that this is a helpful platform to discuss important issues while providing and safe and confidential resource to help cope with residency challenges. **Conclusion**: Further data analysis is underway as we are in the initial stages of implementing the program. In the final stages (April 2018) a pending post-pilot questionnaire will be interpreted to explore barriers, limitations and to determine the role of the network going forward. If found to be effective it is something that can be implemented and adapted for future residents. Other programs can use this feasible model to increase wellness and foster the same supportive environment among residents, especially those separated geographically from peers who may benefit most.
Keywords: geographical distributed learning, innovations in EM education, peer support network

P088

Emergency physicians' approach to head CT scanning for elderly patients who fall: A survey of Canadian, American, British, and Australian emergency physicians

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Introduction: The number of seniors presenting to emergency departments after a fall is increasing. Head injury concerns in this population often leads to a head CT scan. The CT rate among physicians is variable and the reasons for this are unknown. This study examined the role of patient characteristics and country of practice in the decision to order a CT. **Methods**: This study used a case-based survey of physicians across multiple countries. Each survey included 9 cases pertaining to an 82-year old man who falls. Each case varied in one aspect compared to a base case (aspirin, warfarin, or rivaroxaban use, occipital hematoma, amnesia, dementia, and fall with no head trauma). For each case, participants indicated how "likely" they were to order a head CT scan, measured on a 100-point scale. A response of 80 or more was defined a priori as 'likely to order a CT scan'. The survey was piloted among emergency residents for feedback on design and comprehension, and was published in French and English. Recruitment was through the Canadian Association of Emergency Physicians, Twitter and CanadiEM. For each case we compared the proportion of physicians who were 'likely to scan' with relative to the base case. We also compared the proportion of participants who were 'likely to scan' each case in the USA, UK and Australia, relative to Canada. **Results**: Data was collected from 484 respondents (Canada-308, USA-64, UK-67, Australia-27, and 18 from other countries). Social media distribution limited our ability to estimate of the response rate. Physicians were most likely to scan in the anticoagulation cases (90% likely to order a scan compared to 36% for the base case ($p = <0.001$)). Other features associated with increased scans were occipital hematoma (48%), multiple falls (68%), and amnesia (68%) (all $p < 0.005$). Compared to Canada, US physicians were more likely to order CT scans for all cases ($p = <0.05$). Compared to Canada, UK physicians were significantly less likely to order CT for patients in every case except in the patient with amnesia. Finally, Australian physicians differed from Canada only for the occipital hematoma case where they were significantly more likely to order CT scan. **Conclusion**: Anticoagulation, amnesia and a history of multiple falls appear to drive the ordering a head CT scan in elderly patients who had fallen. We observed variations in practice between countries. Future clinical decision rules will likely have variable impact on head CT scan rates depending on baseline practice variation.
Keywords: CT scan, elderly, survey

P089

Multimodal oral analgesia for non-severe trauma patients: feasibility and evaluation of a triage-nurse directed protocol combining low-dose methoxyflurane, paracetamol and oxycodone

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Introduction: Insufficient analgesia affects around 50% of emergency department patients. The use of a protocol helps to reduce the risk of oligoanalgesia in this context. Our objective was to describe the feasibility and efficacy of a multimodal analgesia protocol (combining paracetamol, oxycodone, and inhaled low-dose methoxyflurane) initiated by triage nurse. **Methods**: We performed a prospective, observational study in the emergency department at

Grenoble Alpes University Hospital (Grenoble, France) between October 2017 and April 2018. Non severe adult trauma patients with a numerical pain rating scale (NRS) score ≥4 and receiving MEOF were included. The primary efficacy criterion was the proportion of patients with an NRS score ≤3 at 15min post-administration. Pain intensity was measured for 60 min as well as during radiography. Data on adverse events and satisfaction were also recorded. Data are presented as median [interquartile (IQR)] and were compared using non parametric tests. **Results**: A total of 200 adult patients were included (age: 32 [IQR: 23–49] years; 126 men (63%)). Patients presented at triage with a pain score of 7 [IQR: 6-8]. Sixty-six patients (33%) reported an NRS score ≤3 at 15 min post-administration. The time required to achieve a decrease of at least 2 points in the NRS score was 10 [IQR 5–20] min. The pain intensity was 4 [IQR: 2–5] before radiography and 4 [IQR: 2–6] during radiography. Adverse events were frequent (n = 128, 64%), mainly dizziness. No serious adverse events were reported and 89% of minor adverse events resolved at one hour. Both patients and health care providers reported good levels of satisfaction. **Conclusion**: The administration of a nurse-driven multimodal analgesia protocol combining paracetamol, oxycodone, and low-dose methoxyflurane was feasible on triage. It rapidly produced long-lasting analgesia in adult trauma patients.
Keywords: low-dose methoxyflurane, nurse-driven protocol, trauma pain

P090

A scoping review on patient race, ethnicity, and care in the emergency department

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Introduction: Health disparities between racial and ethnic groups have been well documented in Canada, the United States, and Australia. Despite evidence that differences in emergency department (ED) care based on patient race and ethnicity exist, there is a lack of scientific reviews in this important area. The objective of this review is to provide an overview of the literature on the impact of patient race and ethnicity on ED care. **Methods**: A scoping review guided by the framework described by Arksey and O'Malley was undertaken. This approach was taken because it was best suited to the goal of providing an overview of all of the literature, given the broad nature of the topic. All studies with primary outcomes considering the impact of patient race and ethnicity on "throughput" factors in the ED as defined by Asplin et al., were considered. Outcomes considered included triage scores, wait times, analgesia, diagnostic testing, treatment, leaving without being seen, and patient experiences. Literature from Canada, the United States, Australia, and New Zealand was considered. A database search protocol was developed iteratively as familiarity with the literature developed. Inclusion and exclusion decisions were made using an established model. **Results**: The original search yielded 1157 citations, reduced to 453 after duplicate removal. 153 full texts were included for screening, of which 85 were included for final data extraction. Results indicate there is evidence that minority racial and ethnic groups experience disparities in triage scores, wait times, analgesia, treatment, diagnostic testing, leaving without being seen, and subjective experiences. Authors' suggested explanations for these disparities can be placed in the following categories: (1) communication differences; (2) conscious or unconscious bias; (3) facility and resource factors in hospitals with higher minority presentation rates; and (4) differences in clinical presentations. **Conclusion**: This scoping review provides an overview of the literature on the impacts of race and ethnicity on ED care. As disparities have been shown to exist in numerous contexts, further research on the impact of race and ethnicity in ED care is warranted, especially in the Canadian literature. Such explorations could aid in the informing and creation of policy, and guide practice.
Keywords: disparities, ethnicity, race

P091

Lumbosacral spinal imaging and narcotic prescription for patients presenting to the emergency department with non-traumatic low back pain

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Introduction: Choosing Wisely Canada guidelines suggest that in the absence of red flags or clinical indicators suggestive of serious underlying conditions, physicians should not order radiological images for patients presenting with non-specific low back pain, and current recommendations do not endorse routine prescribing of opioids for this condition. The objective of this study was to determine how many patients presenting to the ED with non-traumatic low back pain have spinal imaging and how many are discharged home on opioids. **Methods**: We conducted a retrospective medical record review for adult (>17 years) patients presenting to an academic tertiary care ED with non-traumatic low back pain from April 1st 2014 to March 31st 2015 (pre-guideline) and April 1st 2017 to March 31st 2018 (post-guideline). Patients were excluded if they were >70 years old, were not discharged home, had a traumatic injury, features of cauda equina syndrome, weight loss, history of cancer, fever, night sweats, chronic use of systemic corticosteroids, chronic use of illicit intravenous drugs, first episode of low back pain over 50 years of age, abnormal reflexes, loss of motor strength or loss of sensation in the legs. **Results**: 1060 (545 pre-guideline, 515 post-guideline) were included. Mean (SD) age was 39.6 (12.3) years and 549 (51.8%) were female. Pre-guideline, 45 (8.3%) patients had spinal imaging, compared to 39 (7.6%) post-guideline (Δ 0.7%; 95% CI: −2.6% to 4.0%). Of the 84 (7.9%) patients who had spinal imaging, 4 (8.9%) had pathologic findings pre-guideline, compared to 10 (25.6%) patients post-guideline. The proportion of patients discharged home with a prescription for opioids was lower after the Choosing Wisely Canada guidelines (40.9% vs. 11.1%; Δ29.8%; 95% CI: 24.8% to 34.7%). **Conclusion**: Choosing Wisely Canada guidelines did not appear to alter the rate of imaging for patients presenting to the ED with non-traumatic low back pain. Overall the rate of spinal imaging was lower than expected. The proportion of patients who were discharged home with a prescription for opioids was lower after the Choosing Wisely Canada guidelines, however we don't know if this represents an overall trend in the reduction of opioid prescribing, or a specific change in practice related to the ED management of low back pain.
Keywords: low back pain, opioids, spinal imaging

P092

Volunteer engagement in the emergency department: A scoping review

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Introduction: Little is known about the variety of roles volunteers play in the emergency department (ED), and the potential impact they have on patient experience. The objective of this scoping review was to identify published and unpublished reports that described volunteer programs in EDs, and determine how these programs impacted patient experiences or outcomes. **Methods**: Electronic searches of Medline, EMBASE, Cochrane Central Register of Controlled Trials, Cochrane Database of Systematic Reviews and CINAHL were conducted and reference lists were hand-searched. A grey literature search was also conducted (Web of Science, ProQuest, Canadian Business and Current Affairs Database ProQuest Dissertations and Theses Global). Two reviewers independently screened titles and abstracts, reviewed full text articles, and extracted data. **Results**: The search strategy yielded 4,589 potentially relevant citations. After eliminating duplicate citations and articles that did not meet eligibility criteria, 87 reports were included in the review. Of the included reports, 18 were peer-reviewed articles, 6 were conference proceedings, 59 were magazine or newspaper articles, and 4 were graduate dissertations or theses. Volunteer activities were categorized as non-clinical tasks (e.g., provision of meals/snacks, comfort items and mobility assistance), navigation, emotional support/communication, and administrative duties. 52 (59.8%) programs had general volunteers in the ED and 35 (40.2%) had volunteers targeting a specific patient population, including pediatrics, geriatrics, patients with mental health and addiction issues and other vulnerable populations. 20 (23.0%) programs included an evaluative component describing how ED volunteers affected patient experiences and outcomes. Patient satisfaction, follow-up and referral rates, ED and hospital costs and length of stay, subsequent ED visits, medical complications, and malnutrition in the hospital were all reported to be positively affected by volunteers in the ED. **Conclusion**: This scoping review demonstrates the important role volunteers play in enhancing patient and caregiver experience in the ED. Future volunteer engagement programs implemented in the ED should be formally described and evaluated to share their success and experience with others interested in implementing similar programs in the ED.
Keywords: emergency department, patient experience, volunteers

P093

Quality assurance programs for tests pending at discharge from emergency departments: a systematic review

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Introduction: Emergency department (ED) care allows for the rapid assessment of patient concerns, but often leads to tests being performed that are not finalized or reviewed prior to patients leaving the ED. The follow-up for these tests pending at discharge (TPADs), most commonly final diagnostic imaging (DI) reports and microbiology cultures, is a major medico-legal concern for ED providers and significant safety concern for patients. We therefore performed a systematic review of the literature to identify existing ED quality assurance (QA) processes to address TPADs relating to final DI reports and microbiology cultures. **Methods**: Comprehensive literature searches were developed with a medical librarian and conducted in Ovid Medline, EMBASE, Cochrane Database of Systematic Reviews, Cochrane Central Register of Controlled Trials, and CINAHL from inception through May 8, 2018. Studies were included if they described an intervention or program designed to follow-up relevant ED TPADs, and excluded if they pertained to communication between departments or clinicians only rather than with patients. Study selection was performed independently by two reviewers in two steps (title and abstract review, then full-text review), with all discrepancies resolved by consensus with a senior reviewer. The primary outcome was the description of any QA process to follow-up on TPADs and secondary outcomes included quantifiable results of successful interventions or programs. **Results**: From the 11,685 articles identified, 58 were selected for full-text review, and 12 met eligibility criteria. In the included studies, the responsibility for following up on TPADs was owned by different members of the care team (e.g., ED physicians, nurses or radiologists) and recorded in a variety of ways (e.g., electronic medical record, paper chart, system designed for TPADs). Follow-up pathways with variable standardization were described, ranging from dedicated assignment for TPAD duties with protected/remunerated time to do so, to follow-up completion done by the first clinician to receive the TPAD result. Studies that evaluated their QA process implementation found that more patients were notified of abnormal test results, follow-up times decreased, and fewer unnecessary antibiotics were used. **Conclusion**: A variety of QA processes have been implemented to follow up on ED TPADs in terms of personnel involved, charting and logistics, and when evaluated, they have improved patient care.
Keywords: patient discharge, patient safety, quality improvement

P094

Evaluation of the National Early Warning Score (NEWS) to guide the orientation of patients with sepsis in the emergency department

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Introduction: The Canadian Triage and Acuity Scale (CTAS) identifies the level of urgency when patients arrive to the Emergency department (ED). Sepsis is challenging to recognize and is associated with significant mortality (30 to 50%). The integration of the COP criteria allows for earlier detection and management of sepsis.The CTAS's validity and reliability are debated. The NEWS score has been suggested to allow a timely recognition of sepsis.Objectives:To describe patient orientation at ED triage with the NEWS vs. the CTAS and COP criteria and to identify the NEWS's ability to detect patients who will require admission to critical care. **Methods**: Design: A retrospective cohort study of ED 225 patients (January-November 2018) is was constituted. **Participants**: Patients were included if they were aged ≥18, consulting to the ED, presented one of the 32 diagnoses included in the CMI-10. **Measurements**: Retained variables are sex, age, CTAS score and level of care. The NEWS score was calculated from triage vital signs. Main outcome was Patient orientation after ED triage using CTAS vs the NEWS score. Descriptive statistics to determine patient orientation based on the NEWS and CTAS were performed. Fisher tests ($\alpha = 0.05$) were used to assess a possible association between both triage scales and identify the NEWS's ability to detect patients who will require admission to critical care during. Sample size was calculated in order to detect a 15% difference between actual orientation and theoretical orientation based on the NEWS. **Results**: The retained cohort (45% men) were aged 66 ± 21 years. 67% were admitted, 14% of which to a critical care unit. Average length of hospital stay was 6.3 ± 7.8 days. Primary objective: patient orientation after triage using CTAS vs the NEWS was: 29% vs. 18% for high risk patients; 2% vs. 67% for low risk patients

($p < 0.0001$), respectively. Secondary objective: Among patients with stable NEWS score, 53% were admitted to hospital among patients with medium NEWS score, 9% of patients were admitted to the critical care ($p = 0.0003$) **Conclusion**: Patient orientation after ED triage using CTAS vs the NEWS is significantly different. The NEWS alone does not seem to be able to detect patients who will require admission to critical care. Future studies exploring an aggregate scoring system combining the NEWS and CTAS could be performed to determine if sepsis recognition and patient orientation can be improved

Keywords: Canadian Triage and Acuity Scale, National Early Warning Score (NEWS), sepsis detection

P095

Preparing emergency patients and providers study: Clinician and patient satisfaction with communication tool

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Introduction: Effective communication to develop a shared understanding of patient/caregiver (P/C) expectations is critical during emergency department (ED) encounters. However, there is limited research examining the use of communication tools of P/C expectations to improve communication in the ED. The objective of this study was to examine satisfaction with a patient expectations questionnaire, known as the PrEPP tool, and its impact on communication and management of patients in the ED. **Methods**: The PrEPP tool collected P/C expectations over 3 phases of the study. In phase1, the PrEPP tool was distributed to all P/Cs (CTAS score of 2 to 5) in four EDs in Nova Scotia. In phase 2 the PrEPP tool was refined to a 5-item questionnaire. In phase 3 the PrEPP tool was re-implemented over a six-month period. Follow-up surveys were distributed to P/Cs via email (phase 1, 3) and HCPs on iPads in the ED (phase 3) to determine the impact of the tool on communication and management of patients. Entries were compiled on a REDCap database and descriptive statistics were used to analyze responses related to satisfaction.The PrEPP tool collected P/C expectations over 3 phases of the study. In phase1, the PrEPP tool was distributed to all P/Cs (CTAS score of 2 to 5) in four EDs in Nova Scotia. In phase 2 the PrEPP tool was refined to a 5-item questionnaire. In phase 3 the PrEPP tool was re-implemented over a six-month period. Follow-up surveys were distributed to P/Cs via email (phase 1, 3) and HCPs on iPads in the ED (phase 3) to determine the impact of the tool on communication and management of patients. Entries were compiled on a REDCap database and descriptive statistics were used to analyze responses related to satisfaction. **Results**: In Phase 1, 11418 PrEPP tools and 147 surveys (29% response rate) were collected from January-June 2016. The majority of P/Cs found the PrEPP questionnaire easy to complete (95.9%) and felt HCPs met their expectations (87.1%). In Phase 3, 951 P/C (31.1% response rate) and 128 HCP surveys were collected. Of P/C respondents 45.9% felt PrEPP helped to communicate expectations, while 49.7% said that they would like to use it on future ED visits. The majority of P/C respondents (75.4%) indicated their expectations were met during their visit to the ED. Of those whose expectations were not met, 69% felt their expectations were not discussed. The majority of HCP respondents (90.4%) indicated they used the PrEPP tool at least sometimes. Also, 78.4% said it influenced patient communication and 42% indicated the tool influenced management of patients at least sometimes. **Conclusion**: Obtaining expectations early in the patient encounter may provide opportunities for improved communication in the ED. P/Cs found the PrEPP tool easy to use to communicate their expectations and HCPs felt it influenced communication and management of patients in the ED. Further qualitative thematic analysis is needed to explore how the PrEPP tool impacted ED visits.

Keywords: communication, emergency department, patient expectations

P096

Prospective pilot implementation of a clinical decision aid for acute aortic syndrome

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Introduction: The RAPID RIP clinical decision aid was developed to identify patients at high-risk for acute aortic syndrome (AAS) who require investigations. It stratifies patients into low (no further testing) intermediate (D-dimer if no alternative diagnosis) and High risk (Computed tomography (CT) aorta). Our objectives were to assess its impact on: a) Documentation of high risk features/pre test probability for AAS b) D-dimers ordered c) CT ordered and d) Emergency department length of stay. **Methods**: We conducted a prospective pilot before/after study at a single tertiary-care emergency department between August and September 2018. Consecutive alert adults with chest, abdominal, flank, back pain or stroke like symptoms were included. Patients with pain >14 days or secondary to trauma were excluded. **Results**: We enrolled 1,340 patients, 656 before and 684 after implementation, including 0 AAS. Documentation of pre test probability assessment increased (0% to 3%, $p < 0.009$) after implementation. The proportion who had D-dimer performed increased (5.8% to 9.2% ($p < 0.2$), while the number of CT to rule out AAS remained stable (0.59% versus 0.58%; $p = 0.60$). The mean length of ED stay was stable (2.31+/−2.0 to 2.28+/−1.5 hours; $p = 0.45$) and slightly decreased in those with pre test probability documented (2.1+/−1.4 $p < 0.09$). The specificity of the decision aid for CT was 100%(95%CI 71.5- 100%). If it were applied to all patients with high-risk clinical features of AAS the specificity would be 92.6% (95%CI 90.1-94.6%). **Conclusion**: Implementation of the RAPID RIP increased documentation of important high-risk features for AAS. The RAPID RIP strategy increased use of D-dimer without increasing the number of CT and had a trend towards decreased length of stay.

Keywords: acute aortic syndrome, clinical decision aid

P097

The characteristics and effectiveness of interventions targeting chronic pain patients in the emergency department: A systematic review and meta-analysis

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Introduction: Patients with chronic non-cancer pain (CNCP) and opioid-use disorders make up a category of patients who present a challenge to emergency department (ED) providers and healthcare administrators. Their conditions predispose them to frequent ED utilization. This problem has been compounded by a worsening opioid epidemic that has rendered clinicians apprehensive about how they approach pain care. A systematic review has not yet been

performed to inform the management of CNCP patients in the ED. As such, the purpose of this project was to identify and describe the effectiveness of interventions to reduce ED visits for high-utilizers with CNCP. **Methods**: Included participants were high-utilizers presenting with CNCP. All study designs were eligible for inclusion if they examined an intervention aimed at reducing ED utilization. The outcomes of interest were the number of ED visits as well as the amount and type of opioids prescribed in the ED and after discharge. We searched Medline, EMBASE, CINAHL, CENTRAL, SCOPUS, Web of Science, and the grey literature from inception to June 16, 2018. Two independent investigators assessed articles for inclusion following PRISMA guidelines. Risk of bias will be assessed using the Cochrane ROBINS-I and RoB 2 tools for non-randomized and randomized trials, respectively. **Results**: Following review, 14 of the 5,018 identified articles were included for analysis. These articles assessed a total of 1,670 patients from both urban and rural settings. Interventions included pain protocols or policies (n = 5), individualized care plans (n = 5), ED care coordination (n = 2), a chronic pain management pathway (n = 1), and a behavioural health intervention (n = 1). Intervention effects trended towards the reduction of both ED visits and opioid prescriptions. The meta-analysis is in progress. **Conclusion**: Preliminary results suggest that interventions aimed at high-utilizers with CNCP can reduce ED visits and ED opioid prescription. ED opioid-restriction policies that sought to disincentivize drug-related ED visits were most successful, especially when accompanied by an electronic medical record (EMR) alert to ensure consistent application of the policy by all clinicians and administrators involved in the care of these patients. This review was limited by inconsistencies in the definition of 'high-utilizer' and by the lack of high-powered randomized studies.

Keywords: chronic pain, emergency medicine, healthcare utilization

P098

Staff and patient attitudes towards influenza vaccination availability during wait times at the Queen Elizabeth II Emergency Department, Halifax, Nova Scotia (in progress)

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Introduction: Influenza is a preventable infectious disease that causes a yearly burden to Canada. While an influenza vaccine is available free of charge in most provinces, uptake is below target rates. 15% of Canadians who did not get the influenza vaccine reported that they "didn't get around to it"; this presents an opportunity to combine the task of influenza prevention with the logistical issue of another health system challenge: escalating emergency department (ED) wait times. At the Queen Elizabeth II Health Sciences Centre (QEII) in Halifax, NS, average wait time is 4.6 hours. Offering the influenza vaccine during this time could increase convenient access to health services, and ultimately, improve vaccination rates. **Methods**: This observational, cross-sectional design study is currently in progress. It aims to gauge public interest, health care provider (HCP) support, perceived barriers and perceived facilitators to influenza vaccine availability at the QEII ED. Data is being collected via short, anonymous, close-ended questionnaires over a 7-week period, set to end Dec 14, 2018. Client participants are a convenience sample of low-acuity (Canadian Triage and Acuity Scale score 4/5), adult clients who use the QEII ED during the study period, anticipated n = 150. Client questionnaires are completed, with the help of a research assistant, on an iPad that inputs data directly into a secure online data collection tool. The HCP group is a convenience sample of nurses, physicians and paramedics currently working in the QEII ED, anticipated n = 80. Questionnaires are available to HCPs either on paper outside the staff lounge, or online. Data is being collected via short, anonymous, close-ended questionnaires over a 7-week period, set to end Dec 14, 2018. Client participants are a convenience sample of low-acuity (Canadian Triage and Acuity Scale score 4/5), adult clients who use the QEII ED during the study period, anticipated n = 150. Client questionnaires are completed, with the help of a research assistant, on an iPad that inputs data directly into a secure online data collection tool. The HCP group is a convenience sample of nurses, physicians and paramedics currently working in the QEII ED, anticipated n = 80. Questionnaires are available to HCPs either on paper outside the staff lounge, or online. **Results**: Following completion of data collection, descriptive statistics, such as the frequency of support for ED influenza vaccination and the proportion of unvaccinated clients willing to receive the vaccine if available in the ED, will be calculated using IBM SPSS Statistics 25. This will provide meaningful data that can be used by the QEII to inform future program planning (i.e. should the influenza vaccine be made available in the ED). **Conclusion**: An ED vaccination program could add value to the hours clients spend waiting to be seen, and make ED care more cohesive. It is essential that clients and ED staff are approached prior to any new initiative; this study is one way we can lay the necessary groundwork for a public health program that would utilize patient "wait time" more effectively.

Keywords: emergency, immunization, influenza

P099

Perceptions of assessment and feedback: hawks, doves and impact on learning

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Introduction: Residency training takes place in a work-place learning environment. Residents may work with several supervisors over the course of their training and each will provide feedback and assessments to them. Each supervisor may have a different approach to the delivery of their feedback and may deliver different assessments for the same quality of performance. Research question: among residents who receive regular feedback how do different styles of feedback by supervisors impact the residents' learning? **Methods**: A qualitative methodology was used. Participants were residents from residency programs that have routine one-on-one feedback and assessment. In depth, semi-structured one-on-one interviews were conducted by the primary investigator (PI). These were then transcribed, reviewed and coded. The participants were University of Toronto and McMaster University residents. Sample size will be determined by thematic saturation and data collection is ongoing. The interview guide was updated in an iterative fashion to further explore themes generated in the initial interviews. Interview transcripts will be reviewed and coded by the PI with assistance from collaborators with qualitative methodological expertise. **Results**: Analysis of the first six participants revealed five themes. Residents described remembering feedback that generated a strong emotional response, both positive and negative; reflection on feedback as a component of using it for learning was consistent; issues with reconciling feedback received that was in conflict with previously feedback; relationship with the individual providing

the feedback impacted feedback interpretation; feedback was parsed by residents to determine the rationale of the assessor and whether to incorporate feedback into learning process. **Conclusion**: How residents use feedback to further their learning is variable. This study identifies that styles of feedback, emotional response and relationship with the provider are all contributors to the learning that occurs after a feedback encounter. It also identifies that residents reflect on feedback differently and make decisions about how to incorporate feedback into their learning and practice. The individuality of these responses to feedback are important for trainee self-reflection in furthering their learning as well as important in faculty development as they develop skills in assessment and feedback. It is also important for training programs that facilitate the trainee supervisor interactions.
Keywords: assessment, feedback, learning

P100
A needs assessment to guide the development of multidisciplinary simulation-based modules relevant to emergency department nurses in Newfoundland and Labrador
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Introduction: Efficient multidisciplinary team dynamics are crucial to the provision of optimal ED care. Physicians and nurses must use a collaborative approach to meet patient needs in this busy setting. This is especially important for high-acuity low-occurrence (HALO) procedures and clinical encounters. Simulation provides a safe environment where learning is enhanced through deliberate practice. Multidisciplinary participation in simulation-based education may augment team cohesiveness and performance. **Methods**: A web-based needs assessment survey was distributed to ED nurses, collecting information on demographics, opinions about simulation-based instruction and perceptions on the value of the proposed collaborative educational approach of the project. Experience and comfort with nursing roles in specific procedures (TV pacer, surgical airway, chest tube, central line, sedation) and clinical encounters (STEMI, CVA, sepsis, anaphylaxis, GI bleed) seen in the ED were also assessed. There were a number of suggestions for topics in addition to those listed. Responses will guide the collaborative development of simulation modules with nursing colleagues on desired topics. **Results**: 58/97 potential nurse participants from 2 urban ED's responded to the survey over an 8-week period, giving a response rate of 58.8%. 76% of respondents had less than 10 years of ED nursing experience, and 34.48% less than 5 years. Responses indicate limited familiarity with simulation-based education (SBE) on ED scenarios with 33.93% being not familiar; 55.36% somewhat familiar. Most prior simulation experience was with role-playing (82%) or low-fidelity setups (42%). Perceived benefit of SBE sessions was substantial (43.86%- very significant; 45.61%- significant). Most respondents had limited past exposure (22.81%- none; 64.91%- 1-5 sims). Similarly, there was little ongoing participation in SBE events with none in 43.64% and 40% just annually. For the 5 clinical scenarios, average responses were: Comfort with assisting 87.45%; Interest in further training 91.43%; Willingness to participate 94.13%. For the 5 procedures, averages were 36.35% (21.36% excluding sedation), 91.27%, 89.09%, respectively. **Conclusion**: Results indicate a low level of familiarity, experience and ongoing exposure with SBE relating to ED training and practice. Participants recognize the potential benefits of using simulation in a multidisciplinary educational setting and indicate a willingness to participate in collaborative teaching sessions.
Keywords: Education, Multidisciplinary, Simulation

P101
The development of entrustable professional activity reference cards to support the implementation of Competence by Design in emergency medicine
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Innovation Concept: Competence by Design (CBD) was implemented nationally for Emergency Medicine (EM) residents beginning training in 2018. One challenge is the need to introduce residents to Entrustable Professional Activities (EPAs) that are assessed across numerous clinical rotations. The Royal College's resources detail these requirements, but do not map them to specific rotations or present them in a succinct format. This is problematic as trainees are less likely to succeed when expectations are unclear. We identified a need to create practical resources that residents can use at the bedside. **Methods**: We followed an intervention mapping framework to design two practical, user-friendly, low-cost, aesthetically pleasing resources that could be used by residents and observers at the bedside to facilitate competency-based assessment. **Curriculum, Tool or Material**: First, we designed a set of rotation- and stage-specific EPA reference cards for the use of residents and observers at the bedside. These cards list EPAs and clinical presentations likely to be encountered during various stages of training and on certain rotations. Second, we developed a curriculum board to organize the EPA reference cards by stage based upon our program's curriculum map. The curriculum board allows residents to view the program's curriculum map and the EPAs associated with each clinical rotation at a glance. It also contains hooks to hang and store extra cards in an organized manner. **Conclusion**: We believe that these practical and inexpensive tools facilitated our residency program's transition to competency-based EPA assessments. Anecdotally, the residents are using the cards and completing the suggested rotation-specific EPAs. We hope that the reference cards and curriculum board will be successfully incorporated into other residency programs to facilitate the introduction of their EPA-based CBD assessment system.
Keywords: Competence by Design, innovations in EM education, resource development

P102
Perspectives surrounding paediatric procedural sedation using intranasal ketamine administration: a qualitative study of emergency nurses
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Introduction: Intranasal ketamine (INK) has an emerging role for procedural sedation (PSA) in children in the emergency department (ED). While INK is less invasive and requires fewer personnel than IV ketamine, widespread adoption in the paediatric ED would require strong nursing acceptance. To inform INK implementation strategies, we explored nursing perspectives surrounding INK, including perceived barriers to its adoption. **Methods**: Nurses in the paediatric ED of London Health Sciences Centre, London, Ontario were recruited by email. Two, one-hour, in-person focus groups were conducted on January 26 and February 2, 2018 using a semi-structured interview format. Transcription was performed by a professional medical transcription service and analyzed using an inductive qualitative approach involving code words corresponding to recurring topics.

Thematic analysis was used to group similar codes into themes. The analytic process was managed using the NVivo 11 software package. **Results**: Results: Eight nurses participated. All nurses were female and had a mean of 8.9 (range: 2.5 - 26) years of pediatric emergency nursing experience. Seven nurses had experience monitoring and administering INK to children for PSA. Five themes emerged: 1) attributes of INK, 2) INK effects on patients and families, 3) INK effects on health care providers, 4) INK effects on the ED environment, and 5) uncertainty regarding INK's effectiveness, predictability, and fit into institutional sedation protocols. Subthemes included 1) perceptions that INK produced a relatively shallower, slower-onset, and/or less titratable sedation, 2) the importance of patient cooperation (i.e. INK may be preferred by providers for older patients undergoing relatively painful or long procedures), 3) belief that INK was an effective anxiolytic and sedative with the potential to improve nursing resource utilization, and 4) belief that physician resistance to change and lack of personal familiarity were barriers to adoption. **Conclusion**: Conclusions: We identified clinical advantages to using INK in children, the importance of selecting appropriate patients, and barriers to widespread INK adoption. Importantly, our findings highlighted uncertainty about INK's effectiveness and incorporation into sedation protocols. Our findings will inform future knowledge translation strategies when implementing INK in the clinical setting.
Keywords: children, intranasal, ketamine

P103

Factors associated with non-optimal resource utilization of air ambulance for interfacility transfer of injured patients

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Introduction: Timely access to definitive care has been associated with improved outcomes for injured patients. Air ambulance services have become an integral part of Canadian trauma systems to help provide earlier access to a lead trauma centre (LTC). Multiple factors can lead to non-optimal resource utilization resulting in potential transport delays. The goal of this study is to identify patient, institutional and paramedic risk factors for non-optimal resource utilization for interfacility transfers of injured adult patients transported by air ambulance to a LTC. **Methods**: Ornge is a paramedic-staffed organization that is the sole provider of air ambulance services from a non-trauma centre to a LTC for the province of Ontario, Canada. This is a retrospective cohort study of all Ornge adult emergent interfacility transports over a 5-year period. Data was collected on patient demographics and clinical status, sending facilities, transport details and paramedic qualifications. Optimal resource utilization was determined based on distance and historical times. A logistic regression model was used to explore patient, provider and institutional risk factors for non-optimal resource use. **Results**: Between January 1, 2013 and December 31, 2017 a total of 1777 injured patients underwent interfacility transport with Ornge. Of these 805 were identified as having non-optimal resource utilization. Patients who had an optimal resource use were found to be older and mechanically ventilated. Risk factors increasing odds of non-optimal transport included patients transported from a nursing station (OR 1.94), transport with primary or advanced care paramedics (OR 6.57 and 1.44, respectively) and transport between both 0800-1700 and 1700-0000 (OR 1.40 and 1.54, respectively). The median delay to arrival to receiving facility if a patient had a non-optimal resource use was 40 minutes **Conclusion**: We were able to identify several factors resulting in non-optimal resource utilization. We believe that nursing stations as a sending facility and type of paramedics crew transporting patients resulted in non-optimal resource utilization mainly due to these patients being of lower acuity and this affecting their triage. However the timing of day is more likely to be a resource availability issue and something that can be further studied and potentially improved.
Keywords: emergency medical services, prehospital, trauma

P104

Can patients suffering traumatic cardiac arrest be identified using the National Ambulatory Care Reporting System (NACRS) database?

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Introduction: Trauma is a common cause of mortality across all age groups and is projected to become the third greatest contributor to global disease burden. Recent studies have demonstrated that survival from traumatic cardiac arrest (TCA) is more favourable than once believed and further research on this population is being encouraged. Currently, it is unclear whether existing databases, such as the National Ambulatory Care Reporting system (NACRS), which includes all emergency department visits, could be used to identify TCAs for population-based studies. We aimed to determine the accuracy of NACRS administrative codes in identifying TCA patients. **Methods**: This retrospective validation study used data acquired from NACRS and our institutional Patient Care System. We identified a number of International Classification of Diseases, tenth revision (ICD-10) diagnostic, procedural and cause of injury codes that we hypothesized would be consistent with TCA. NACRS was subsequently searched for patients meeting the diagnostic code criteria (January 1 - December 31, 2015). The following inclusion criteria were: an eligible ICD-10 diagnostic code or a qualifying Canadian Classification of Health Interventions (CCI) procedure code and an eligible ICD-10 external cause of injury code. Electronic medical records for these patients were then reviewed to determine whether true TCAs had occurred. **Results**: Eighty-five patients met the inclusion criteria and one was excluded from analysis due to inaccessible health records, leaving 84 patients eligible for chart review. Overall, 55% (n = 46) of patients were found to have true TCA, 35% (n = 29) sustained a cardiac arrest of non-traumatic etiology and 11% (n = 9) were considered "unclear" (i.e. could not determine whether it was a true TCA based on the medical records). We found that true TCA patients were most accurately identified using a combination of ICD-10 CA cardiac arrest and external cause of injury codes (Positive predictive value: 70.6%, 95% CI 46.9-86.7). **Conclusion**: TCA patients were identified with moderate accuracy using the NACRS database. Further efforts to integrate specific data fields for TCA cases within existing population databases and trauma registries is necessary to facilitate future studies focused on this patient population.
Keywords: ambulatory care, cardiac arrest, trauma

P105

Charting in the electronic medical record: Perspectives of Emergency Medicine residents

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Introduction: The literature reveals that residents spend significant amounts of time working with and charting in electronic medical

records (EMR). As adoption of EMRs accelerates among emergency medicine (EM) departments, postgraduate programs will need to adapt curricula related to communication in the patient record. In order to make targeted changes, clinician-educators need a better understanding of how the documentation practices of trainees develop and change over residency, as well as the challenges they face in effectively charting. We gathered the perspectives of EM residents on data entry in the EMR to identify opportunities for such change. **Methods**: We recruited residents from all five years of the Royal College EM residency program at Queen's University and conducted focus groups from August to October 2018. Data collection was audio recorded and later transcribed. Line-by-line coding was performed independently by both AR and NP. A final codebook was validated by ZH. The codebook was then thematically analyzed to identify and characterize themes from the data. The study was approved by the Queen's University Health Sciences Research Ethics Board. **Results**: 15 EM residents participated. Groups discussed similar challenges with charting, including time constraints, ensuring sufficient, but appropriate detail, variable preceptor expectations, and an inability to draw diagrams. All residents noted formal teaching of the SOAP note framework during medical school and reported receiving an introductory EMR session. Groups highlighted the importance of feedback, especially from physicians with medicolegal experience. They also described more informal learning strategies, including receiving tips from preceptors during shifts and reading the notes of others. They also reported that changes in their documentation practices as junior and senior residents were largely due to a graduation of responsibility and medicolegal considerations. **Conclusion**: Our results suggest there is a lack of formal postgraduate training for EM residents with respect to documentation in the EMR with reliance on informal teaching and feedback. Future work should explore opportunities to address this gap with various educational strategies, including the development of specific objectives, application of consistent expectations, modelling of excellent chart notes in teaching, and instruction by preceptors with medicolegal experience.
Keywords: documentation, electronic medical record, postgraduate education

P106

The HINTS exam: An often misused but potentially accurate diagnostic tool for central causes of dizziness

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Introduction: Dizziness is a common presentation in emergency departments (ED), accounting for 2-3% of all visits. The HINTS (Head impulse test, Nystagmus, Test of skew) exam has been proposed as a accurate test to help differentiate central from peripheral causes of vertigo. It is only applicable to patients presenting with acute vestibular syndrome (acute onset dizziness or vertigo, ataxia, nystagmus, nausea and/or vomiting, and head motion intolerance). We aimed to assess the diagnostic accuracy of HINTS in detecting central causes of dizziness and vertigo in adult patients presenting with AVS. **Methods**: We performed a medical records review of all patients with a presenting complaint of dizziness to a tertiary care ED between Sep 2014 and Mar 2018. We excluding those with symptoms >14days, recent trauma, GCS <15, hypotensive, or syncope/loss of consciousness. Data were extracted by 5 trained reviewers using a standardized data collection sheet. Individual patient data were linked with the Institute of Clinical Evaluation Science (ICES) database to assess for any patients with a missed central cause. The primary outcome measure was a central cause of dizziness; cardiovascular accident (CVA), transient ischemic attack (TIA), brain tumour (BT) or multiple sclerosis (MS) as diagnosed on either computed tomography, magnetic resonance imaging, neurology consult or diagnostic codes within ICES. **Results**: 3109 patients were identified and 2309 patients met the inclusion criteria, of those 450 patients (44% male) were assessed using HINTS exam. Of those examined with HINTS, 7 patients (1.6% - 4 CVA 2 TIA 1 MS) were determined to have a central cause for their dizziness. HINTS had a sensitivity of 28.6% (95% CI 3.7 – 71%), specificity 95% (95%CI 92.6-96.9%). Of the individuals assessed with HINTS, only 16 presented with AVS (3.6%), of which three patients were found to have a central cause (CVA 2, TIA 1). HINTS in AVS for all central causes is 66.7% (95%CI 9.4-99.2%)sensitive but is 100%(95%CI 15.8-100%) for CVA alone (excluding TIA). Only 38%(16/42) of patients presenting with AVS were assessed using the HINTS exam. **Conclusion**: The current use of HINTS is inaccurate and it is used inappropriately in a large number of patients. Future studies should focus on the correct implementation of HINTS in the ED only in patients presenting with AVS.
Keywords: clinical exam, vertigo

P107

Understanding the sensory experience of performing a rare, high-stakes clinical procedure: a qualitative study of clinicians with lived experience

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Introduction: Emergency physicians (EP) are expected to be competent in a variety of uncommon but life-saving procedures, including the bougie assisted cricothyrotomy (BAC). Given the rarity and high-stakes nature of the BAC, simulation is often used as the primary learning and training modality. However, mental practice (MP), defined as the "cognitive rehearsal of a skill in the absence of overt physical movement", has been shown to be as effective as physical practice in several areas, including athletics, music, team-based resuscitation and surgical skill acquisition. MP scripts incorporate cues from different sensory modalities to supplement instructions of how to complete the skill. We sought to explore EPs perspectives on the kinesthetic, visual and cognitive aspects of performing a BAC to inform the development of a MP BAC script. **Methods**: We undertook a qualitative interview study of EPs at a single tertiary care centre who had done a BAC in clinical practice. Participants were recruited using purposive sampling. The primary method for data collection was in-depth semi-structured qualitative interviews, which were recorded and transcribed verbatim. Data collection and analysis were concurrent; transcripts were coded independently by two researchers using qualitative content analysis on a coding framework based on the previously developed BAC checklist. At each procedural step, the kinesthetic, visual and cognitive cues that enhance MP were identified. **Results**: Eight EPs (5 staff; 3 Royal College residents) participated in the interviews. All participants had completed at least one BAC in their clinical practice. Data analysis revealed recurrent themes signifying successful completion of each procedural step. These include visual (ie. seeing a spray of blood upon entry into the airway) and kinesthetic (ie. feel of the tracheal rings on a finger) cues that describe aspects of the procedure not found in traditional teaching

modalities, such as textbooks. **Conclusion**: Knowledge gleaned from the interviews of EPs with lived experience gives us a deeper insight into the sensory aspects of performing a BAC in clinical practice. We expect that using these experientially derived cues to inform the development of a MP script will increase its validity and applicability to learners and for skill maintenance. Future work includes evaluating the utility of the developed script in acquiring and maintaining competence performing the BAC.
Keywords: mental practice, script

P108

Characterizing use of next-day ultrasound from the emergency department

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Introduction: Formal ultrasound imaging, with use of ultrasound technicians and radiologists, provides a valuable diagnostic component to patient care in the Emergency Department (ED). Outside of regular weekday hours, ordering formal ultrasounds can produce logistical difficulties. EDs have developed protocols for next-day ultrasounds, where the patient returns the following day for imaging and reassessment by an ED physician. This creates additional stress on ED resources – personnel, bed space, finances – that are already strained. There is a dearth of literature regarding the use of next-day ultrasounds or guidelines to direct efficient use. This study sought to accumulate data on the use of ED next-day ultrasounds and patient oriented clinical outcomes. **Methods**: This study was a retrospective chart review of 150 patients, 75 from each of two different tertiary care hospitals in Saskatoon, Saskatchewan. After a predetermined start date, convenience samples were collected of all patients who had undergone a next-day ultrasound ordered from the ED until the quota was satisfied. Patients were identified by an electronic medical record search for specific triage note phrases indicating use of next-day ultrasounds. Different demographic, clinical, and administrative parameters were collected and analyzed. **Results**: Of the 150 patients, the mean age was 35.9 years and 75.3% were female. Median length of stay for the first visit was 4.1 hours, and 2.2 hours for the return visit. Most common ultrasound scans performed were abdomen and pelvis/gyne (34.7%), complete abdomen (30.0%), duplex extremity venous (10.0%). Most common indications on the ultrasound requisition were nonspecific abdominal pain (18.7%), vaginal bleeding with or without pregnancy (17.3%), and hepatobiliary pathology (15.3%). Ultrasounds results reported a relevant finding 56% of the time, and 34% were completely normal. After the next-day ultrasound 5.3% of patients had a CT scan, 10.7% had specialist consultation, 8.2% were admitted, and 7.3% underwent surgery. **Conclusion**: Information was gathered to close gaps in knowledge about the use of next-day ultrasounds from the ED. A large proportion of patients are discharged home without further interventions. Additional research and the development of next-day ultrasound guidelines or outpatient pathways may improve patient care and ED resource utilization.
Keywords: emergency department, next-day ultrasound, ultrasound

P109

A retrospective cohort comparing symptom management of breathlessness and pain in cancer versus non-cancer conditions

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Introduction: In Nova Scotia, under the Paramedics Providing Palliative Care program, paramedics can now manage symptom crises in patients with palliative care goals and often at home without the need to transport to hospital. Growing recognition that non-cancer conditions benefit from a palliative approach is expanding the program. Our team previously found treatment of pain and breathlessness is not optimized, pain scores are underutilized, and paramedics were more comfortable (pre-launch) with a palliative approach in cancer versus non-cancer conditions. Our objective was to compare symptom management in cancer versus non-cancer subgroup. **Methods**: We conducted a retrospective cohort study. The Electronic Patient Care Record and Special Patient Program were queried for patients with palliative goals from July 1, 2015 to July 1, 2016. Descriptive analysis was conducted and results were compared with a t-test and Bonferroni correction (alpha = $p < 0.007$). **Results**: 1909 unique patients; 765/1909 (40.1%) cancer and 1144/1909 (59.9%) non-cancer. Female sex: cancer 357/765 (46.7%), non-cancer 538/1144 (47.0%). Mean age cancer: 73.3 (11.65), non-cancer 77.7 (12.80). Top non-cancer conditions: COPD (495/1144, 43.3%), CHF (322/1144, 28.1%), stroke (172/1144, 15.0%) and dementia (149/1144, 13.0%). Comorbidities for cancer patients (range): 0 to 3; non-cancer 0 to 5. Most common chief complaint (CC) for cancer and non-cancer: respiratory distress, 10.8% vs 21.5%. Overall, no difference in proportion treated cancer vs non-cancer, 11.5% vs 10.1%, $p = 0.35$. Some difference in individual therapies: morphine 83/765 (10.8%) vs 55/1144 (4.8%), $p < 0.001$, hydromorphone 9/765 (1.2%) vs 2/1144 (0.2%), $p = 0.014$, salbutamol 38/765 (5.0%) vs 5/1144 (0.4%), $p < 0.001$ and ipratropium 27/765 (3.5%) vs 134/1144 (11.7%), $p < 0.001$, in addition to any support with home medication which is not queriable. Pre-treatment pain scores were documented more often than post-treatment in both groups (58.7% vs 25.6% ($p < 0.001$), 57.4% vs 26.9% ($p < 0.001$)). **Conclusion**: Non-cancer patients represent an important proportion of palliative care calls for paramedics. Cancer and non-cancer patients had very similar CC and received similar treatment, although low proportions, despite pre-launch findings that non-cancer conditions were likely to be under-treated. Pain scores remain underutilized. Further research into the underlying reason(s) is required to improve the support of non-cancer patients by paramedics.
Keywords: non-cancer, palliative care, paramedics

P110

Are there differences in student academic and clinical performance after rotations at tertiary or community care Emergency Medicine teaching sites?

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Introduction: Canadian undergraduate medical Emergency Medicine (EM) rotations are often completed at either tertiary care centres or regional community hospitals. While the latter offer students exposure to different practice settings and population needs, many students perceive that teaching at tertiary care EM departments is superior to that in community hospitals. At our institution, third year undergraduate medical students complete three-week EM rotation at either a tertiary centre or a community hospital. We compared academic and clinical performance between students trained in tertiary care centres and students trained in community hospitals. **Methods**: Academic and clinical performance in EM was evaluated based on the results of an EM-specific multiple choice examination

(MCQE) and an annual Objective Structured Clinical Exam (OSCE) assessing competency in a broad range of clinical scenarios commonly addressed in EM. The 40-question MCQE is administered quarterly and a mix of old and new questions are used to ensure consistency. The OSCE is administered annually and relies on the same principal to remain consistent. OSCE scores are binary: pass or fail. We reviewed MCQE and OSCE scores from three consecutive cohorts of students. Students were pooled into two groups, tertiary and community, based on the site of their EM rotation. Mean MCQE and OSCE performance were compared between the two groups of students using two-tailed unpaired T tests. Chi squared tests were used to identify significant differences in scores between cohorts. **Results**: MCQE and OSCE scores from 312 students over three consecutive cohorts were analyzed. Cohorts included 104, 100, and 108 students with 61% trained in tertiary centres (N = 191). Students trained in tertiary centres had a mean MCQE score of 77%. Students from community centres had a mean score of 78%. There was no significant difference in MCQE scores between tertiary- and community-trained students (p = 0.6099). The OSCE pass rate was 97% for students trained in tertiary centres and 98% for students trained in community centres. OSCE pass rates were not significantly different between the two groups (p = 0.8145). **Conclusion**: Despite student perceptions that training in tertiary care EM centres was superior, objective analysis showed that academic and clinical performance were similar regardless of training site.

Keywords: clinical clerk, emergency medicine, performance evaluation

P111

Introduction of an ECPR protocol to paramedics in Atlantic Canada; a pilot knowledge translation project

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Introduction: There is currently no protocol for the initiation of extra corporeal cardiopulmonary resuscitation (ECPR) in out of hospital cardiac arrest (OHCA) in Atlantic Canada. Advanced care paramedics (ACPs) perform advanced cardiac life support in the prehospital setting often completing the entire resuscitation on-scene. Implementation of ECPR will present a novel intervention that is only available at the receiving hospital, altering how ACPs manage selected patients. Our objective is to determine if an educational program can improve paramedic identification of ECPR candidates. **Methods**: An educational program was delivered to paramedics including a short seminar and pocket card coupled with simulations of OHCA cases. A before and after study design using a case-based survey was employed. Paramedics were scored on their ability to correctly identify OHCA patients who met the inclusion criteria for our ECPR protocol. Scores before and after the education delivery were compared using a two tailed t-test. A 6-month follow-up is planned to assess knowledge retention. Qualitative data was also collected from paramedics during simulation to help identify potential barriers to implementation of our protocol in the prehospital setting. **Results**: Nine advanced care paramedics participated in our educational program. Mean score pre-education was 9.7/16 (61.1%) compared to 14/16 (87.5%) after education delivery. The mean difference between groups was 4.22 (CI = 2.65-5.80, p = 0.0003). There was a significant improvement in the paramedics' ability to correctly identify ECPR candidates after completing our educational program. **Conclusion**: Paramedic training through a didactic session coupled with a pocket card and simulation appears to be a feasible method of knowledge translation. 6-month retention data will help ensure knowledge retention is achieved. If successful, this pilot will be expanded to train all paramedics in our prehospital system as we seek to implement an ECPR protocol at our centre.

Keywords: cardiac arrest, education research, simulation

P112

In situ simulation: A team sport?

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Introduction: Identification of latent safety threats (LSTs) in the emergency department is an important aspect of quality improvement that can lead to improved patient care. In situ simulation (ISS) takes place in the real clinical environment and multidisciplinary teams can participate in diverse high acuity scenarios to identify LSTs. The purpose of this study is to examine the influence that the profession of the participant (i.e. physician, registered nurse, or respiratory therapist) has on the identification of LSTs during ISS. **Methods**: Six resuscitation- based adult and pediatric simulated scenarios were developed and delivered to multidisciplinary teams in the Kingston General Hospital ED. Each ISS session consisted of a 10- minute scenario, followed by 3-minutes of individual survey completion and a 7- minute group debrief led by ISS facilitators. An objective assessor recorded LSTs identified during each debrief. Surveys were completed prior to debrief to reduce response bias. Data was collected on participant demographics and perceived LSTs classified in the following categories: medication; equipment; resources and staffing; teamwork and communication; or other. Two reviewers evaluated survey responses and debrief notes to formulate a list of unique LSTs across scenarios and professions. The overall number and type of LSTs from surveys was identified and stratified by health care provider. **Results**: Thirteen ISS sessions were conducted with a total of 59 participants. Thirty- four unique LSTs (8 medication, 15 equipment, 5 resource, 4 communication, and 2 miscellaneous issues) were identified from surveys and debrief notes. Overall, MDs (n = 12) reported 19 LSTss (n = 41) reported 77 LSTs, and RTs (n = 6) reported 4 LSTs based on individual survey data. The most commonly identified category of LSTs reported by MDs (36.8%) and RTs (75%) was equipment issues while RNs most commonly identified medication issues (36.4%). Participants with □5 years of experience in their profession, on average identified more LSTs in surveys than participants with >5 years experience (1.9 LSTs vs 1.5 LSTs respectively). **Conclusion**: Nursing staff identified the highest number of LSTs across all categories. There was fairly unanimous identification of major LSTs across professions, however each profession did identify unique perspectives on LSTs in survey responses. ISS programs with the purpose of LST identification would benefit from multidisciplinary participation.

Keywords: in situ simulation, latent safety threats, patient safety

P113

Variability in utilization and diagnostic yield of computed tomography (CT) scans for pulmonary embolism among emergency physicians

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Introduction: Current data on utilization of CT imaging point to a trend of increasing overutilization of CT Angiography for the diagnosis of pulmonary embolism (CTPA) over time. Multiple educational and institution-wide interventions addressing this overutilization have been proposed, implemented and evaluated, with mixed results in terms of long-term impact on physician ordering behaviour. The objective of this study is to examine the inter-physician variability in ordering rates and diagnostic yield of CTPA, under a working hypothesis that a small number of physicians are responsible for a disproportionately high number of CTPA ordered in the ED. **Methods**: Data was collected on all CTPA studies ordered by ED physicians at two very high volume community hospitals and an affiliated urgent care centre during the 2-year period between January 1, 2016 and December 31, 2017. Analysis was limited to those ED physicians who had a total of greater than 500 ED visits over the course of the 2-year period. For each physician, two calculations were made: 1) CT PE ordering rate (total number of CTPA ordered divided by the total number of ED visits), and 2) CTPA diagnostic yield (total number of CTPA positive for PE divided by the total number CTPA ordered). Additional analysis was carried out in order to identify the highest orderers of CTPA and their diagnostic yield. **Results**: A total of 2,789 CTPA were ordered by 84 physicians for 461,045 total ED visits. Preliminary results show a great deal of variation in ordering rates, ranging from 0.9 to 22.2 CTPA per 1000 ED visit (median = 4.8, IQR = 4.5). Similarly, there was high variation in CT PE yield, ranging from 0% to 50% (median = 9.6%, IQR = 13.1%). Those physicians in the top quartile for ordering rate had a lower mean diagnostic yield, when compared to the lower quartiles (8.9% when compared to 11.5%, 11.9% and 18.2% for the physicians in the third, second, and first quartile respectively). **Conclusion**: The findings of this study indicate a wide degree of variability in CTPA ordering patterns and diagnostic yield among physicians working within the same clinical environment. There is some suggestion that those physicians who order disproportionately higher numbers of CTPAs have lower diagnostic yields. However, the more interesting lessons from this initial study center on the challenges in creating an audit-and-feedback program targeting CTPA 'overutilizers'.

Keywords: computed tomography, health services utilization, pulmonary embolism

P114

Geographies of sexual assault: using geographic information system analysis to identify neighbourhoods affected by violence

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Introduction: Emergency Departments are a common point of access for survivors of sexual and gender-based violence (SGBV), but very little is known about where survivors live and the characteristics of the neighbourhoods. The objective of this study was to use hospital-based data to characterize sexual and domestic assault cases and identify geographic distribution across the Ottawa-Gatineau area. **Methods**: Data for this study were extracted from the Sexual Assault and Partner Abuse Care Program (SAPACP) case registry (Jan 1-Dec 31, 2015) at The Ottawa Hospital. Spatial analyses were conducted using 6-digit postal codes converted to Canadian Census Tracts to identify potential geographic areas where SGBV cases are clustered. Hot-spots were defined as Census Tracts with seven or more assaults within a single calendar year.Data for this study were extracted from the Sexual Assault and Partner Abuse Care Program (SAPACP) case registry (Jan 1-Dec 31, 2015) at The Ottawa Hospital. Spatial analyses were conducted using 6-digit postal codes converted to Canadian Census Tracts to identify potential geographic areas where SGBV cases are clustered. Hot-spots were defined as Census Tracts with seven or more assaults within a single calendar year. **Results**: In 2015, there were 406 patients seen at the SAPACP, 348 had valid postal codes from Ottawa-Gatineau and were included in the analyses. Over 90% of patients were female and 152 (43.68%) were below 24 years of age. Eight hot-spots were identified including 3 in the downtown entertainment district, 3 lower income areas, 1 high income neighbourhood, and 1 suburb more than 20km from downtown. **Conclusion**: This study is of the first to use hospital-based data to examine the geographic distribution of SGBV cases, with key findings including the identification of high-income neighbourhoods and suburbs as SGBV hot-spots. Alongside efforts like the #MeToo movement, this evidence challenges stereotypes of assault survivors and highlights the breadth and widespread nature of SGBV.

Keywords: domestic violence, intimate partner violence, sexual assault

P115

Outcomes of out of hospital cardiac arrest in First Nations vs. non-First Nations patients in Saskatoon

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Introduction: One in nine (11.7%) people in Saskatchewan identifies as First Nations. In Canada, First Nations people experience a higher burden of cardiovascular disease when compared to the general population, but it is unknown whether they have different outcomes in out of hospital cardiac arrest (OHCA). **Methods**: We reviewed prehospital and inpatient records of patients sustaining an OHCA between January 1st, 2015 and December 31st, 2017. The population consisted of patients aged 18 years or older with OHCA of presumed cardiac origin occurring in the catchment area of Saskatoon's EMS service. Variables of interest included, age, gender, First Nations status (as identified by treaty number), EMS response times, bystander CPR, and shockable rhythm. Outcomes of interest included return of spontaneous circulation (ROSC), survival to hospital admission, and survival to hospital discharge. **Results**: In all, 372 patients sustained OHCA, of which 27 were identified as First Nations. First Nations patients with OHCA tended to be significantly younger (mean age 46 years vs. 65 years, $p < 0.0001$) and had shorter EMS response times (median times 5.3 minutes vs. 6.2 minutes, $p = 0.01$). There were no differences between First Nations and non-First Nations patients in terms of incidence of shockable rhythms (24% vs. 26%, $p = 0.80$), ROSC (42% vs. 41%, $p = 0.87$), survival to admission (27% vs 33%, $p = 0.53$), and survival to hospital discharge (15% vs. 12%, $p = 0.54$). **Conclusion**: In Saskatoon, First Nations patients

sustaining OHCA appear to have similar survival rates when compared with non-First Nations patients, suggesting similar baseline care. Interestingly, First Nations patients sustaining OHCA were significantly younger than their non-First Nations counterparts. This may reflect a higher burden of cardiovascular disease, suggesting a need improved prevention strategies.

Keywords: emergency medical services, First Nations, out of hospital cardiac arrest

P116

Impact of young age on outcomes of emergency department procedural sedation

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Introduction: Procedural sedation in the emergency department (ED) for children undergoing painful procedures is common practice, however little is known about sedation in very young children. We examined the effect of young age on sedation outcomes. **Methods**: This is a secondary analysis of an observational cohort study of children 0-18 years undergoing procedural sedation in six pediatric EDs across Canada. We compared presedation state, indication for sedation, medications, sedation efficacy and four main post-sedation outcomes (serious adverse events (SAE), significant interventions, oxygen desaturation and vomiting) between patients who ≤2 years with those >2 years. Pre-sedation state, medications, indication for sedation and time intervals were summarized using frequency and percentage and compared with chi2 test. Logistic regression was used to examine associations between age group and outcomes. **Results**: 6295 patients were included; 5349 (85%) were >2 years and 946 (15%) were ≤2 years. Children ≤2 years were sedated most commonly for laceration repair (n = 450; 47.6%), orthopedic reduction (165; 17.4%) and abscess incision and drainage (136; 14.4%). Children >2years were sedated most commonly for orthopedic reductions (3983; 74.5%). Ketamine was the most common medication in both groups, but was used most frequently in children ≤2 years (80.9% vs 58.9%; p < 0.001). There was no difference in the incidence of SAE, significant interventions or oxygen desaturation between age groups, however children ≤2 years were less likely to vomit (Table 1). Young children had decreased odds of a successful sedation (OR 0.48; 95% CI: 0.37 to 0.63). On average, patients ≤2 years were sedated for 7 minutes less (74.1 vs 81.0 p < 0.001) and discharged 10 minutes sooner (90.1 vs 100.8 p < 0.001). Table 1 ≤2 years (n = 946) >2 years (n = 5349) OR (95%CI)* p-value n(%) n(%) Serious Adverse Event 8 (0.85) 59 (1.0) 0.76 (0.43-1.7) 0.477 Significant intervention 10 (1.0) 76 (1.4) 0.74 (0.34-1.4) 0.374 Oxygen Desaturation 50 (5.3) 303 (5.6) 0.93 (0.67-1.3) 0.640 Vomiting 14 (1.5) 314 (5.9) 0.24 0.13-0.41) <0.001 *Reference category: ≤2 years. **Conclusion**: Children ≤2 years most commonly received ED sedation for laceration repair using ketamine. Young age was not associated with a significant difference in SAEs, significant intervention or desaturation but was associated with decreased odds of vomiting and of successful sedation.

Keywords: pain, pediatric, sedation

P117

Procedural skills training in emergency medicine physicians within the Edmonton zone: a needs assessment

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Introduction: Procedural skills are a key component of an emergency physician's practice. The Edmonton Zone is a health region that comprises eleven tertiary, urban community and rural community emergency departments (EDs) that represents over three hundred emergency physicians. We report the initial stakeholder and site leadership needs assessment used to inform the development of a comprehensive continuing professional development (CPD) procedural skills curriculum for the Edmonton Zone. **Methods**: A list of procedural skills was distributed to the two Edmonton Zone Clinical Department Heads of Emergency Medicine (EM). This list was based on a previous Canadian study that utilized procedures from the Objectives of Training in EM. Based on perceived needs, twenty-five procedures were chosen by consensus from zone leadership and study authors as the initial focus for a skills curriculum. This list was sent via survey to the physician site leads of all EDs in the zone. Each site lead was asked to indicate the fifteen procedure curriculum they felt would most benefit their respective physician groups. Responses were collated to look at all departments as a group and stratified by the type of ED (tertiary, urban and rural community). **Results**: Every site chief of Edmonton Zone EDs completed the survey (100% response rate). Cricothyrotomy and pediatric intubation were the two procedures prioritized by every site. One procedure (ultrasound guided central lines) was prioritized by 10/11 sites while three procedures (ultrasound guided central lines, adult intubation and chest tube insertion) were specified by 9/11 sites as needs. Two procedures (pericardiocentesis and thoracotomy) were named as priorities only by tertiary centers. Conversely, three procedures (extensor tendon repair, anterior and posterior nasal packing) were highlighted by all rural sites, but not consistently by any urban sites. **Conclusion**: Over the next few years, competency-based CPD will emerge for physicians in practice. Our preliminary needs assessment showed that while a common zone-wide curriculum will be possible, targeted curricula tailored to the unique needs of the various types of EDs will also be necessary. This has implications for the resources and teaching requirements needed to deliver effective and recurring CPD courses to an entire health region. A targeted needs assessment to all Edmonton Zone physicians will be the next step to verify and further elaborate on these preliminary results.

Keywords: continuing professional development, curriculum, simulation

P118

Older adults in the emergency department: a retrospective cross-sectional study of the geriatric population in Edmonton emergency departments

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Introduction: The geriatric patient population accounts for an ever increasing proportion of emergency department (ED) visits. Geriatric centered EDs are an emerging area of interest and research. Though there have been past studies looking at older patient presentations at individual hospitals, there is limited data describing geriatric presentations within an entire Canadian geographic health region. This study characterizes the population of older adults utilizing the EDs in the Edmonton Zone, a health region that comprises a total of eleven tertiary (T), urban community (UC) and rural community (RC) hospitals. **Methods**: This retrospective cross-sectional study targeted all patients ≥65 years presenting to the Edmonton Zone EDs between April 1, 2017 to March 31, 2018. Data was extracted from the

Emergency Department Information System (EDIS) database for ten EDs in the health region. Clinical and administrative data points were extracted and examined for each site. **Results**: We analyzed 100,813 ED geriatric patient visits during our study period, accounting for 18.7% of total ED visits to the Edmonton Zone. The five most common triage complaints at ED presentation were shortness of breath, abdominal pain, chest pain with cardiac features, general weakness, and back pain. CTAS scores 1-3 were assigned to 77.8% of geriatric presentations (T: 86.3%, UC: 77.4%, RC: 60.9%). 27.3% of geriatric patients had presented to an ED within the past 30 days (T: 30.0%, UC: 25.4%, RC: 27.7%). On average, 35.3% of older adult ED visits involved a consultation (T: 51.7%, UC 30.8%, RC 14.6%) and approximately 25% of geriatric patients were admitted to hospital during their ED visit (T: 42.8%, UC: 19.4%, RC: 7.1%). The average length of stay (LOS) in the ED (hh:mm) was 10:19 (T: 10:24, UC: 11:38, RC: 5:43). Overall, 2.4% of all geriatric patients left an ED without being seen after initial registration (T: 2.7%, UC: 2.2%, RC: 2.1%). **Conclusion**: Older adults represent a significant proportion of the ED visits in the Edmonton Zone. The triage acuity, LOS, re-presentation, consultation and admission rates varied based on the type of ED, which has implications for resource allocation within the health region. Our results can also direct future targeted initiatives and quality improvement projects to the various types of EDs in the Edmonton Zone, and facilitate planning of ED services for older adults in other health regions who have a similar geographic distribution of care sites.

Keywords: frailty, geriatrics, older adults

P119

Characteristics and outcomes of patients with neurologic complaints who leave the emergency department without being seen

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Introduction: Patients with neurologic chief complaints comprised 12.5% of total visits to the University of Alberta Emergency Department (ED) in 2017. Symptoms are often subjective, transient, or atypical, leading to diagnostic uncertainty. Serious diagnoses require timely intervention to mitigate morbidity and mortality, however the proportion of patients who leave the ED without being seen (LWBS) has increased over time. We sought to analyze the characteristics and outcomes of patients with neurologic complaints who LWBS to identify opportunities for improvement in quality and safety of patient care. **Methods**: Data was extracted from the Emergency Department Information System (EDIS) and National Ambulatory Care Reporting System database to select adult patients presenting to the University of Alberta Hospital in 2017 with neurologic complaints as defined by the Canadian Triage Acuity Scale (CTAS). Using standard descriptive statistics we examined demographic and clinical characteristics to compare LWBS patients to all others. **Results**: Of 8,726 total visits 7.54% patients LWBS. These patients tended to be younger on average (39 vs 55 years), with a larger proportion presenting at night (37.69%) and on Monday. The majority were triaged CTAS 3 (68.69%). Their mean length of stay was shorter than all other visits (3.70 vs 9.51 hours). Headache (22.74%), extremity weakness/symptoms of CVA (20.19%), head injury (14.32%), seizure (8.28%), and sensory loss/paresthesia (8.14%) comprised the top 5 neurologic complaints, and were disproportionately presented in LWBS patients; headache (31.76%), head injury (23.71%), sensory loss/paresthesia (12.01%), seizure (11.25%). Patients who LWBS also re-presented to the ED within 72 hours (21.43%), more often than those discharged by a physician (8.29%). **Conclusion**: Patients presenting with neurologic complaints who LWBS are younger, tend to arrive at night, with less acute presentations, however they more frequently return to the ED within 72 hours than those seen and discharged. Patients who LWBS may benefit from education, physician assessment or closer nurse reassessment at triage to increase the quality and safety of care in the ED, reduce return visits and ED utilization.

Keywords: neurology, triage, utilization

P120

Characteristics and outcomes of patients with neurologic complaints who have an unscheduled return visit to the emergency department within 72 hours

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Introduction: Patients with neurologic presenting complaints comprised 12.5% of total University of Alberta Emergency Department (ED) visits in 2017. This group of patients has high rates of EMS utilization, admission, and ED resources including diagnostic imaging and consult services. We sought to analyze the characteristics and outcomes of the patients with neurologic complaints who have an unscheduled return visit (URV) to the ED within 72 hours to identify opportunities for improvement in quality and safety of patient care. **Methods**: Data was extracted from the Emergency Department Information System (EDIS) and National Ambulatory Care System databases to select adult patients presenting to the University of Alberta hospital in 2017 with neurologic complaints as defined by the Canadian Triage and Acuity Scale (CTAS). We additionally selected for return visits to Edmonton Zone EDs within 72 hours. Using standard descriptive statistics, we examined demographic and clinical characteristics of patients with 72-hour URV. **Results**: Of 8,770 total visits, 674 (7.69%) had a 72-hour URV to an Edmonton zone ED. The URV rate was 9.0% in patients seen by a physician and discharged with approval and 23.4-33.3% in patients who left against medical advice (LAMA), prior to completion of treatment (LPCT), or without being seen by a physician (LWBS). The mean age of URV patients was 45.6 years, 56.5% were male, with a mean ED length of stay of 7.37 hours. The top 5 diagnoses for URV patients were headache, migraine, alcohol related disorders, concussion, and transient ischemic attack. 14.7% of URV patients were admitted, 13.5% LWBS, 1.6% LAMA, 1.6% LPCT, and 66.1% were discharged. **Conclusion**: The majority of neurologic complaint patients with URV within 72 hours are those who LAMA, LPTC, or LWBS at index visit. The admission rate for URV patients (14.7%) is lower than for the index ED visit (55%), however these patients have high LWBS rates. Identifying strategies to limit the LWBS rate for these patients would reduce return visits and improve the quality and safety of patient care.

Keywords: neurology, unscheduled return

P121

Prehospital ultrasound use among Canadian aeromedical service providers – a cross-sectional survey

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Introduction: Evidence suggests that prehospital point of care ultrasound (POCUS) may improve outcomes. It serves as an aid in physical examination, triage, diagnosis, and patient disposition. The rate of adoption of POCUS among aeromedical services (AMS) throughout Canada is unknown. The objective of this study was to describe current POCUS use among Canadian AMS providers. **Methods**: This is a cross-sectional observational study. A survey was emailed to directors of government-funded AMS bases in Canada. Data was analyzed using descriptive statistics. **Results**: The response rate was 88.2% (15/17 AMS directors) and accounted for 42 out of 46 individual bases. POCUS is used by AMS in British Columbia, Alberta, Saskatchewan, and Manitoba. New Brunswick, Nova Scotia, Prince Edward Island, and Yukon are planning to introduce POCUS within the next year. Ontario, Quebec, and Newfoundland are not utilizing POCUS and are not planning to introduce it. BC is the only province currently using POCUS on fixed-wing aircraft. POCUS is used in <25% of missions, most frequently at sending hospital and in flight. Most useful applications were assessment for pneumothorax, free abdominal fluid, and cardiac standstill. Most common barrier to POCUS use was cost of training and maintenance of competence. **Conclusion**: Prehospital POCUS is available in Western Canada with one third of the Canadian population having access to AMS utilizing ultrasound. The Maritimes and the Yukon Territory will further extend POCUS use on fixed-wing aircraft. While there are barriers to POCUS use, those bases that have adopted POCUS consider it valuable.

Keywords: point of care ultrasound, prehospital, ultrasound

P122

Narrative assessment of emergency medicine learners: What should we keep as we move to competency-based assessment?

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Introduction: For many years, Emergency Medicine (EM) educators have used narrative comments to assess their learners on each shift, either in isolation or combined with some type of Likert scale ranking. Competency based medical education (CBME), soon to be fully implemented throughout Canadian EM educational programs, encourages this type of frequent low-stakes narrative assessment. It is important to understand what information is currently garnered from existing narrative assessments in order to successfully and smoothly transition to the CBME system. The purpose of this study was to explore how one Canadian undergraduate EM program's narrative assessment comments mapped to two competency frameworks: one traditional CanMEDS-based and one competency-based, built on entrustable professional activities (EPAs). **Methods**: A qualitative and quantitative content analysis of 1925 retrospective, narrative assessments was conducted for the 2015/2016 and 2016/2017 academic years. The unprompted comments were mapped to the Royal College CanMEDS framework and the Association of Faculties of Medicine of Canada EPA Framework. Using an iterative coding process as per accepted qualitative methodologies, additional codes were generated to classify comments and identify themes that were not captured by either framework. **Results**: 93% and 85% of the unprompted narrative assessments contained comments that mapped to at least one CanMEDS role or EPA competency, respectively. The most common CanMEDS role commented upon was Medical Expert (86%), followed by Communicator, Collaborator and Scholar (all at 23%). The most common EPA competency mentioned related to history and physical findings (62%) followed by management plan (33%), and differential diagnosis (33%). However, 75% of narrative comments contained within the assessments, included ideas that did not fall into either framework but were repeated with frequency to suggest importance. The experiential characteristics of working with a learner were commented upon by 22% of preceptors. Other unmapped themes included contextual information, generalities and platitudes, and directed feedback for next steps to improve. **Conclusion**: While much of the currently captured data can be mapped to established frameworks, important information for both learner and assessor may be lost by limiting comments to the competencies described within a particular framework, suggesting caution when transitioning to a CBME assessment program.

Keywords: competency based medical education, medical student, narrative assessments

P123

Retrospective review of transfusions for anemia ordered in the emergency department and concordance with guidelines

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Introduction: Iron Deficiency Anemia (IDA) is a common presentation to the emergency department (ED) and is often treated with red blood cell transfusions. Choosing Wisely and the American Association of Blood Banks released guidelines in 2016 outlining under what circumstances transfusions should be given for patients with IDA. Few well-powered studies have looked at the impact of these guidelines on transfusions in EDs. The goal of this study was to examine the number of RBC transfusions that were given in EDs in Calgary, Alberta from 2014-2018 and what proportion of these were potentially avoidable (PA). **Methods**: We analyzed 8651 IDA patient encounters from 2014–2018 at four centers in the Calgary Zone. A transfusion was considered PA if the patient's hemoglobin (hgb) was ≥70 g/L AND if the patient was hemodynamically stable. We performed descriptive statistics to assess the number of transfusions and the number of avoidable transfusions. We used chi-squared tests to determine if there were significant differences between site, time-period, hemoglobin level. **Results**: In total, 990 (11.4%) of the encounters received transfusions; 711 (71.8%) were indicated while 279 (28.1%) were PA. Out of the transfusions that were indicated, 230 (32.3%) were given to patients with a hgb <70 g/L and 481 (67.7%) were given to patients with a hgb >70 g/L but who were hemodynamically unstable. Out of the transfusions that were PA, the highest number were given to those in the 71-80 g/L hgb group (142) and the lowest number were given to those in the 110-130 g/L hgb group (9), a difference that was statistically significant ($p < 0.001$). The PA transfusion rates from 2014 to 2018 were 30.8%, 25.6%, 34.5%, 23.6%, 20.7% respectively, which was a statistically significant difference ($p = 0.004$). **Conclusion**: Our data suggest that the number of PA transfusions at the hospitals in the Calgary zone is comparable to the rates reported in the existing literature. In addition, the rate of PA transfusions has decreased since the release of the guidelines. A limitation of the present study was that it did not look at the number of units of red blood cells transfused and since many patients receive more than one unit, it is possible that the number of PA transfusions was underestimated. Nevertheless, we intend to use our results to create a safer and more cost-effective approach to managing IDA.

Keywords: Transfusions for Anemia

P124

Canadian faculty experience of participating in a global health partnership working to build emergency medicine capacity in Ethiopia

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Introduction: Global health partnerships (GHPs) between high income and low income countries are a means of capacity building in education. Literature often focuses on the GHP structure and output, along with retention and experience of local trainees, but neglects the experience of involved faculty. Here, we survey Canadian teaching faculty participating in the Toronto Addis Ababa Academic Collaboration in Emergency Medicine (TAAAC-EM) to describe characteristics of participants and their experience in the program. **Methods**: EM faculty participating in TAAAC-EM teaching trips from 2011-2016 were invited to complete an online survey in February 2017. Teaching faculty travel for one month and undergo an extensive selection process, pre-departure training and post-trip debriefing. Quantitative and qualitative data were collected and analyzed using basic statistics and inductive thematic analyses respectively. **Results**: Overall, 19 (N = 30, 63.3%) faculty completed the survey, of which 13 had prior global health experiences (range 1 to > 12 months). On a scale of 1-7, participants rated their mean overall experience as a 5.9 and preparation as a 5.7. Among respondents, 79% would participate in future TAAAC-EM activities, 79% would engage in future global health endeavours, 95% said the experience improved their satisfaction of practicing clinical medicine and 89% said it improved their enjoyment of teaching medicine. However, while 58% stated they would recommend this experience without hesitation to colleagues, the remaining 42% said they would recommend this experience with caveats. This latter group had a lower rated preparedness (MD = 1.398, p = 0.003) and TAAAC-EM experience (MD = 1.545, p = 0.001). Major themes in qualitative responses included that the participants felt that intrinsic motivation and flexible predispositions were necessary to participate. Intrinsic motivation for global health involvement included appreciation and impact for GH, and personal growth. Regarding flexibility, respondents highlighted the importance of having a flexible demeanor to understand, accommodate and ethically address cultural differences and practicing in another context. **Conclusion**: The type of faculty to recruit for GHPs may require flexible predispositions and intrinsic motivation for GH. These qualities combined with adequate preparation can facilitate overall faculty experiences on global health trips.

Keywords: global health, medical education, professional development

P125

Faculty development in the age of competency-based medical education: a national, cross-sectional needs assessment for Canadian emergency medicine faculty

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Introduction: In July 2018, Emergency Medicine (EM) transitioned to the Royal College of Physicians and Surgeons of Canada's (RCPSC) Competence by Design (CBD) training framework. In anticipation of CBD implementation, we conducted a nation-wide needs assessment of EM faculty and senior residents to understand their attitudes towards CBD, workplace-based assessments (WBA) and overall educational needs. **Methods**: A multi-site, cross-sectional digital survey was conducted in winter 2018 with a sample of EM faculty and senior residents across RCPSC EM programs in Canada. Recruitment was via program director nomination. Survey domains included baseline perceptions about CBD, attitudes toward implementation, perceived/prompted and unperceived faculty development needs. Microsoft Excel was used to calculate descriptive statistics. This study was reviewed by the Hamilton Integrated Research Ethics Board.A multi-site, cross-sectional digital survey was conducted in winter 2018 with a sample of EM faculty and senior residents across RCPSC EM programs in Canada. Recruitment was via program director nomination. Survey domains included baseline perceptions about CBD, attitudes toward implementation, perceived/prompted and unperceived faculty development needs. Microsoft Excel was used to calculate descriptive statistics. This study was reviewed by the Hamilton Integrated Research Ethics Board. **Results**: Between February-April 2018, 47 participants (40 faculty, 7 residents) completed the survey (58.8% response rate). Most respondents (89.4%) thought learner feedback should be provided on each shift; 55.3% believed they provided adequate feedback. Time constraints, learner disinterest and fear of assessment repercussions were the top three barriers to providing good feedback. A majority of respondents (78.7%) thought that the ED provided above average opportunities for direct observation and 91.5% were confident of incorporating WBAs into their practice. 44.7% reported that CBD will not impact patient care; 17.0% perceived it may have a negative impact. 55.3% felt that CBD will lead to improved feedback for trainees. The top areas for faculty development were: feedback delivery, completing WBAs, resident promotion decisions, and receiving feedback on teaching. Only 25.5% were interested in learning about CBD, although the average of correct responses on the CBD knowledge test was 44.6%. **Conclusion**: EM is well-situated to transition to CBD given clinicians' positive attitudes towards feedback, direct observation, WBAs, and opportunities for direct observation. Threats to CBD implementation are concerns about effects on patient care and trainee education, and skepticism regarding effects on feedback quality. Faculty development should concentrate on further developing clinical teaching and supervision skills, focusing on feedback and WBAs.

Keywords: change management, Competence by Design, faculty development

P126

Entrepreneurship in healthcare and health education: A scoping review

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Introduction: Today's emergency department sees healthcare system pressures manifest through longer wait times, increased costs, and provider burnout. In the face of questionable sustainability, there is a greater role for training future innovators and entrepreneurs in healthcare. However, there is currently little formal education or mentorship in these areas. The aim of this scoping review was to identify the current and ideal educational practices to foster innovative and entrepreneurial mindsets, with specific interest amongst emergency medicine trainees. **Methods**: Using a scoping review methodology, the relationship between healthcare and entrepreneurship was explored. OVID, PubMed and Google Scholar were searched using

the keywords "entrepreneurship", "health education" and "health personnel", on March 8th, 2018. Results were screened by title, abstract and full text by a team of three calibrated researchers, based upon pre-defined exclusion and inclusion criteria. The final list of papers was reviewed using an extraction tool to identify demographics, details of the paper, and its attitudes and perceptions towards entrepreneurship and innovation. **Results**: After screening, 59 papers were identified for qualitative analysis. These papers ranged from 1970-2018, mainly from the USA (n = 36). Most papers were commentaries/opinions (n = 35); 11 papers described specific innovations. Entrepreneurship was viewed positively in 45 papers, negatively in 2 papers, and mixed in 12 papers. Common specialties discussed were surgery (n = 9), internal medicine (n = 3), and not specified (n = 44). Emergency medicine was described in one paper. Major themes were: entrepreneurial environment (n = 29), funding and capital (n = 12), idea generation (n = 9), and teaching entrepreneurship (n = 6). Of the 11 innovation papers, the discussion was focused on educational (n = 6) or system (n = 5) innovations. These innovations related to surgery (n = 1), public health (n = 1) and palliative care (n = 1). None of these innovations were specific to emergency medicine. **Conclusion**: This review indicates a small number of programs focused on promoting innovation and entrepreneurship amongst trainees, but no programs specific to the emergency department. There may be benefit for educators in emergency medicine to consider how to foster a greater innovative spirit in our speciality, so our next generation of physicians can help tackle problems affecting patient care.
Keywords: entrepreneurship, health education, innovation

P127

Health information technology and the Ontario emergency department return visit quality program - A population level continuous quality improvement program

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Introduction: Emergency department (ED) return visits are used for quality monitoring. Health information technology (HIT) has historically supported return visit programs in the same hospital or hospital system. The Emergency Department Return Visit Quality Program (EDRVQP) is a novel population level continuous quality improvement (QI) program connecting EDs across Ontario that leverages HIT. We sought to describe the EDRVQP HIT architecture, experience of participants, enabling program factors and barriers. **Methods**: The Informatics Stack conceptual framework was used to describe the HIT architecture. A literature review of peer-reviewed background literature, and stakeholder organization reports was conducted. Purposive sampling identified key informants. Semi-structured interviews were conducted until saturation. Common themes were identified by inductive qualitative thematic analysis. **Results**: Twenty-three participants from 15 organizations were interviewed. The EDRVQP architecture description is presented across the Informatics Stack. The levels from most comprehensive to most basic are world, organization, perspectives/roles, goals/functions, workflow/behaviour/adoption, information systems, modules, data/information/knowledge/algorithms, and technology. Enabling factors were a high rate of EHR adoption, provincial legislative mandate for data collection and program membership, use of functional and data standards, local variability, phased deployment, and QI and patient safety culture. Two main barriers were increased case turnaround time and privacy legislation. **Conclusion**: The Informatics Stack framework provides a robust approach to thoroughly describe the HIT architecture of this population health programs. The EDRVQP is a population health program that illustrates the pragmatic use of continuous QI methodology across a population (provincial) level.
Keywords: emergency department, information technology, public health informatics

P128

Describing variability in treatment of THC hyperemesis in the emergency department: a health records review

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Introduction: Cannabis Hyperemesis Syndrome (CHS) is a new and poorly understood phenomenon with a subset of patients presenting to emergency departments (ED) for symptomatic control of their refractory nausea and vomiting. Curently, there is a lack of agreement and considerable practice variability on initial treatment modalities for CHS. The objective of this study was to describe the treatment modalities for patients presenting to ED with cannabis-related sequelae. **Methods**: This was a health records review of patients ≥18 years presenting to one of two tertiary care EDs (annual census: 150,000) with a discharge diagnosis including cannabis use with one of abdominal pain or nausea/vomiting using ICD-10 codes. Trained research personnel collected data from medical records including demographics, clinical history, results of investigations, and utilization of treatment options within the ED. Descriptive statistics are presented where appropriate. **Results**: From April 2014 to June 2016, 203 unique ED patients had a discharge diagnosis including cannabis use with abdominal pain or nausea/vomiting. Sixty-nine (33.4%) received any treatment during their visit with 28 (40.6%) receiving IV fluids, of which 24 (85.7%) received normal saline. Anti-emetics were used in 21 (30.4%) patients with ondansetron being the first-line agent in 11 (52.4%) patients followed by dimenhydrinate in 6 (28.6%) and haloperidol in 2 (9.5%) cases. Six patients required two doses of anti-emetics, favouring ondansetron in 3 cases followed by haloperidol, dimenhydrinate, and metoclopramide each used once. Thirteen (19%) patients required analgesia, with the first-line preference being non-opioid medications in 11 versus opioids in 2 cases. Seven patients required multiple modes of analgesia, favouring opioid medications in 4 patients. Twenty-eight (40.6%) patients required anxiolytics with lorazepam being used primarily in 16 (57.1%) patients followed by lorazepam/haloperidol in 5 (17.9%) cases. **Conclusion**: This ED-based study demonstrates variability of practice patterns for symptomatic treatment of cannabis related ED presentations. Despite knowledge of haloperidol being useful in patients with suspected CHS, physicians opted for ondansetron as first line anti-emetics. Future research should focus on studying various treatment modalities of patients with suspected CHS in the ED to optimize symptomatic treatment.
Keywords: cannabis, nausea, pain

P129

Safer transitions in the care of the elderly: identification of essential information in transitional care

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Introduction: When presenting to the Emergency Department (ED), the care of elderly patients residing in Long Term Care

(LTC) can be complicated by threats to patient safety created by ineffective transitions of care. Though standardized inpatient handover tools exist, there has yet to be a universal tool adopted for transfers to the ED. In this study, we surveyed relevant stakeholders and identified what information is essential in the transitions of care for this vulnerable population. **Methods**: We performed a descriptive, cross sectional electronic survey that was distributed to physicians and nurses in ED and LTC settings, paramedics, and patient advocates in two Canadian cities. The survey was kept open for a one month period with weekly formal reminders sent. Questions were generated after performing a literature review which sought to assess the current landscape of transitional care in this population. These were either multiple choice or free text entry questions aimed at identifying what information is essential in transitional periods. **Results**: A total of 191 health care providers (HCP) and 22 patient advocates (PA) responded to the survey. Within the HCPs, 38% were paramedics, 38% worked in the ED, and 24% were in LTC. In this group, only 41% of respondents were aware of existing handover protocols. Of the proposed informational items in transitional care, 100% of the respondents within both groups indicated that items including reason for transfer and advanced care directives were essential. Other areas identified as necessary were past medical history and baseline functional status. Furthermore, the majority of PAs identified that items such as primary language, bowel and bladder incontinence and spiritual beliefs should be included. **Conclusion**: This survey demonstrated that there is a need for an improved handover culture to be established when caring for LTC patients in the ED. Education needs to be provided surrounding existing protocols to ensure that health care providers are aware of their existence. Furthermore, we identified what information is essential to transitional care of these patients according to HCPs and PAs. These findings will be used to generate a simple, one page handover form. The next iteration of this project will pilot this handover form in an attempt to create safer transitions to the ED in this at-risk population.

Keywords: geriatrics, patient safety, quality improvement

P130

Timely initial assessment by a physician (IAP) improves community emergency department wait times

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Introduction: Prior Canadian Emergency Department (ED) studies have demonstrated variable benefits of initial assessment physician (IAP) to rapidly assess and initiate care of ED patients after triage. These studies have been conducted primarily in academic teaching and large urban hospitals. It is not clear if such an IAP role could be beneficial in an small community hospital. Our pilot study hypothesized that instituting a supported IAP role can reduce physician intial assessment (PIA) time, total ED length of stay (LOS), and left-without-being-seen (LWBS) rates. **Methods**: This was a pre and post interrupted time series observational study at a community ED in Niagara Health Systems (Welland Ontario, 4 MD shifts, 36hrs total coverage, 30000 annual visits). In July 2017, an IAP ED shift (with separate assessment/treatment area) was re-purposed, with nursing support, to reduce initial time to MD assessment after triage. For lower acuity cases, the IAP MD generally completed full case management & disposition. Higher acuity complex cases were initiated by IAP, and transferred into the main ED care areas for "inside" MD management. Administrative data was accessed for 6 months prior to intervention, and 4 months available post-intervention. Descriptive statistics were calculated for collected data. **Results**: A modest improvement in different administrative ED performance metrics was observed. The following changes were noted pre and post IAP intervention: PIA time reduced from 3.6hrs to 3.2hrs, total ED LOS reduced from 19.2hrs to 13.8hrs, and daily LWBS rate reduced from 4.2% to 3.7%. This pilot study demonstrated improvement trends in ED performance metrics, although there is insufficient data to show statistical significance. Aggregate data was not subgrouped based on CTAS categories. This pilot was not intended to collect patient or staff satisfaction data, adverse events, nor designed to demonstrate cost-effectiveness **Conclusion**: Introducing an IAP shift in a small community ED has shown improvement trends for various ED throughput measures pertaining to outcomes such as PIA time, total LOS and LWBS rates. Further research is required to determine statistical significance of time reductions, satisfaction (patients, staff), resource utilization impact and CTAS subgroup performance. This improvement demonstrates potential impact system-wide across Niagara region.

Keywords: administration, flow, wait times

P131

An environmental scan of patient emailing and texting practices at Ontario emergency departments

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Introduction: Email and text messaging holds the potential to not only contact patients after emergency department (ED) care for clinically important communications such as appointment reminders, but also to solicit feedback for quality improvement and/or participation in research. A necessary first step though is the collection of electronic contact information, but little is known about current practice in Ontario EDs. In this study, we sought to characterize current collection, consent and use of patient email and texting to communicate with ED patients at academic and community hospitals across Ontario. **Methods**: We developed a questionnaire, with a blend of multiple choice and open-ended questions, targeted at ED registration administrators. The questions focused on if and how EDs collect, store and consent for patient emails, how and what they utilize those emails for and if they text patients. The questionnaire was administered both online and by phone. Participants were recruited through snowball sampling, including facilitated dissemination of the questionnaire via an existing listserv of the Patient Registration Network of Ontario (PRNO). **Results**: Twenty-two respondents (41% response rate) completed the questionnaire. Seven of the 22 institutions were academic health centres (32%). Nine institutions (41%) collected patient email addresses in the ED and none collected or used text message technology. In all 9, registration staff were tasked with asking, consenting, collecting and storing patient details within their hospital admissions, discharge and transfer system (ADT). For sites with email address collection, respondents estimated 40-60% of ED patients shared an email address. Seven of 9 institutions had a verbal consent process, while 2 used implied consent. Only 2 institutions used email to send patients post-discharge feedback questionnaires and four used email to facilitate access to patient portals. Four institutions were looking at using text messages to direct patients at triage, sometime in the future. **Conclusion**: Engagement in optimized care and feedback requires communication which is quickly

shifting to electronic format. Collection of electronic contact information continues to be slow and uneven in Ontario. There is an immediate need for clearer guidance to accelerate collection, storage, consent and use of email and text messaging technology.
Keywords: environmental scan, patient emails, texting patients

P132

Trampoline park safety perceptions of caregivers of patients presenting to the paediatric emergency department in London, Ontario

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Introduction: Trampoline injuries are frequent complaints of children presenting to paediatric emergency departments (PED) in Canada. The medical community has recognized the danger of recreational trampoline use, with the Canadian Paediatric Society (CPS) formally recommending against their use. A new type of trampoline recreation has recently emerged in the form of trampoline parks. Trampoline parks are dangerous, with similar rates of injury as backyard trampolines, and an increased likelihood of injuries warranting hospital admission. No current Canadian governmental or industry regulations exist for trampoline parks. This study aimed to determine the public perspective of trampoline park safety in order to provide a basis for addressing the current lack of safety recommendations around trampoline parks. **Methods**: Parents/caregivers of children seeking care in the PED were approached to participate in a survey regarding trampoline safety. Parents/caregivers of patients with severe injury/illness were excluded. Survey questions included demographics, safety perceptions of both home trampolines and trampoline parks, as well as awareness of the CPS statement regarding trampoline use. The survey was completed in the Research Electronic Data Capture System. **Results**: To date, 68 participants have completed the survey. 66% of participants (45/68) were aware of the new trampoline parks recently opening in the community. 31/68 (46%) of participants had allowed their child to visit a trampoline park. A comparison of the perception of the relative safety of trampoline parks found that 31% of participants (21/67) considered home trampolines "safe/very safe" while 39% of participants (26/66) considered trampoline parks "safe/very safe." The median [IQR] age at which participants thought children could safely play at trampoline parks was 10 [3-15]. 43% of participants (29/67) thought the current CPS statement about backyard trampolines should apply to trampoline parks, and 93% of participants (62/67) thought the Ontario government should institute mandatory standards for trampoline parks. **Conclusion**: Trampoline parks are a significant emerging source of paediatric injury. Trends in preliminary data suggest that participants consider trampoline parks to be safer than backyard trampolines, and perceive that young children can safely participate in trampoline park activities. Should final survey data analysis support these trends, a call for adjustment of CPS guidelines and public policy should proceed.
Keywords: injury, paediatrics, trampoline park

P133

Why the emergency department is the wrong place for patients with early pregnancy complications: A qualitative study of patient experience

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Introduction: Women experiencing complications of early pregnancy frequently seek care in the emergency department (ED), as most have not yet established care with an obstetrical provider. The objective of this study was to explore the lived experiences and perceptions of care of women treated for early pregnancy complications in the ED and early pregnancy clinic (EPC). **Methods**: We conducted an interpretive phenomenological qualitative study of women who presented to the ED or EPC of an urban tertiary care hospital with early pregnancy loss or threatened loss. We employed purposive sampling to recruit participants for in-depth, one-on-one telephone interviews conducted approximately 6 weeks after the index visit. Data collection and analysis were concurrent and continued until thematic saturation had occurred. Our research team of two qualitative researchers, a clinician, a clinical researcher, and a research student performed a phenomenologically-informed thematic analysis including three phases of coding to identify essential patterns of lived experience and meaning across the sample. **Results**: Interviews were completed with 30 women between July and August 2018. Participants ranged in age from 22 to 45 years and reflected the diversity of the multicultural city where the study occurred. Four key themes of patient experience were identified: tensions between what is known and unknown by women and ED staff about early pregnancy complications and care in hospital, stigmatization of early pregnancy complications and ED use, normalization of a chaotic experience, and the overwhelm of unexpected outcomes during the ED visit. **Conclusion**: The perspectives of women attending the ED or EPC for early pregnancy complications highlights the ways in which the current health care system minimizes and medicalizes early pregnancy complications in this setting and fails to adequately support these women. The emotional complexity of this medical situation is often overlooked by ED staff and can produce encounters that are traumatic for patients and families. However, the participants' negative experiences occurring in the ED were often mitigated with their care in their follow-up with the EPC.
Keywords: early pregnancy complications, miscarriage, women's health

P134

Organizational interventions and policies to support second victims in acute care settings: a scoping study

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Introduction: The harm that may come to healthcare providers impacted by adverse events has led them to be called "second victims." Our objective was to characterize the range and context of interventions used to support second victims in acute care settings. **Methods**: We performed a scoping study using the process described by Arksey and O'Malley. Comprehensive searches of scientific databases and grey literature were conducted in September 2017 and updated in November 2018. A library scientist searched PubMed, CINAHL, EMBASE and CENTRAL. We sought unpublished literature (Canadian Electronic Library, Proquest and Scopus) and searched reference lists of included studies. Stakeholder organizations and authors of included studies were contacted through email, requesting information on relevant programs. Two reviewers independently reviewed titles and abstracts using predetermined criteria. Using a structured data abstraction form, two reviewers independently extracted data and appraised methodological quality with the Mixed Methods

Appraisal Tool (MMAT). All discrepancies were resolved through consensus. A qualitative approach was used to categorize the context and characteristics of the identified strategies and interventions. **Results**: Our search strategy yielded 3883 results. After screening titles and abstracts, 173 studies underwent full text screening. Extracted data reflected 21 interventions categorized as providing peer-support (n = 7), proactive education (n = 7) or both (n = 7). Programs came from Canada (n = 2), Spain (n = 2), and United States (n = 17). Specific traumatic events were described as the trigger for development of five programs. While some programs were confined to a standard definition of second victim as a healthcare provider traumatized by an "unanticipated adverse patient event" (n = 6), other programs had a broader scope (n = 12) including situations such as non-accidental trauma, stressful anticipated patient events and complaints/litigation (3 programs were unclear about the definition). Confidentiality was assured in nine peer support programs. Outcome measures were often not reported and were limited in terms of quality. **Conclusion**: This is a new area of study with little scientific rigour from which to determine whether these programs are effective. Concerns about protecting healthcare providers from potential legal proceedings hinder documentation and study of program effectiveness.
Keywords: peer support, second victim

P135

TriagED: A serious game for mass casualty triage and field disaster management

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Innovation Concept: Mass Casualty Incidents (MCI) are complex events that most paramedics encounter only a few times in their careers. Triaging and managing multiple patients during an incident requires different skills than typically practiced by prehospital providers. Simulation and drills can provide an opportunity to practice those skills, but are costly and resource intensive while only allowing a few providers to be in a triage or leadership role. It is important to find engaging and less expensive methods for teaching MCI triage and initial scene management. **Methods**: The authors have developed and are testing a card game based on the previously published GridlockED board game. The game was developed utilizing an iterative process previously described. This game was tested with paramedics as well as other emergency medicine learners to determine usability, engagement, fidelity, as well as usefulness in teaching MCI triage and patient-flow concepts. **Curriculum, Tool or Material**: The card game provides a focused learning experience to allow providers to practice initial triage of multiple injured patients as well as manage patient flow from the scene to area hospitals when faced with limited prehospital resources and capabilities. Players work together in various simulated scenarios to correctly triage injured patients and send them to the correct healthcare facility. **Conclusion**: Serious gaming has gained momentum in medical education. Developing novel curriculae around low frequency, high stakes situations using a game like TriagED may hold the key to ensure prehospital care providers are trained for these incidents. In the future, games which integrate an element of Incident Command or receiving hosptials (e.g. full integration with GridlockED game) may help to further explore the relationship between scene management and patient flow within receiving hospitals.
Keywords: innovations in EM education, mass casualty triage, serious gaming

P136

Increasing access to computed tomography scanning in the emergency department and its effect on patient outcomes

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Background: There is growing concern about emergency physicians overuse of computed tomography (CT). In an attempt to ensure appropriate ordering many hospitals implement strict protocols for ordering of CT scans in the emergency department (ED) that include approval of all scans by a board-certified radiologist, and a reduced access to CT overnight. **Aim Statement:** The aim of this study is to review the impact of RAD ED – direct access to CT ordering by ED physicians, 24hr CT technologist and third-party reporting on CT scans overnight. Our objectives were to assess the effect on; 1) ED length of stay, 2) number of CT scans ordered and 3) admission rates. **Measures & Design**: We conducted a prospective pilot before & after study at a single tertiary-care emergency department between February 1st, 2018 and July 31st, 2018. Inclusion criteria were adult patients presenting to the emergency department and undergoing CT for any of the following: face, neck, spine, upper and lower extremities, chest, abdomen and pelvis. Exclusion criteria were those undergoing CT head for stroke or trauma. **Evaluation/Results:** A total of 924 patients met our criteria, 352 before and 568 after implementation. Comparison of the patient populations demonstrate very similar characteristics in both groups; (49% male, average age 56 years, CTAS 2(40%) and 3(47%). Results demonstrate that an additional 216 scans were performed in post-implementation group. This equates to an increase of 61%. ED length of stay averaged 5.6 hours pre-implementation and 4.7 hours post-implementation. This corresponds to a significant reduction in length of stay of approximately 0.9 hours ($p < 0.01$). Collection is currently ongoing for factors that we will adjust for a multivariate analysis, including admission rates. **Discussion/Impact:** RAD ED led to a significant increase in CT ordering and decrease in ED length of stay. We believe that this project provides important information to clinicians and patients with regards to overall CT utilization, ED wait times, follow up visits for CT scanning and admission rates. It is also important for administrators to help decide if these new rules are leading to improved efficiency, and to help estimate their financial impact.
Keywords: computed, quality improvement and patient safety, tomography

P137

Methods for teaching managerial skills in the emergency department: a survey of Canadian educators

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Introduction: Emergency department (ED) crowding and increased patient load has been shown to have an impact on physician decision making and patient mortality. As the volumes in Canadian EDs increase, so does the need to effectively prepare new learners for the challenges ahead. This study aims to determine which level of training varying teaching techniques should be employed to educate Emergency Medicine (EM) residents about ED management and flow in the age of competency based medical education. **Methods**: We designed a survey that contained a previously derived list of ED flow and management teaching strategies. We piloted and edited

the survey based on feedback from operations and educational experts. A total of 21 teaching techniques were included in the final survey ranging from didactic teaching sessions to experiential techniques such as residents running the department with supervision. Then, we invited members of the Royal College of Physicians and Surgeons of Canada EM specialty committee, the Canadian Association of Emergency Physicians Education Scholarship Section, and the Canadian EM Simulation Educators Collaborative to participate in our survey. We analysed the results using simple descriptive statistics. **Results**: A total of 21 EM (38% female, 62% male) educators from 11 programs (78% of Royal College Training sites) responded to the survey, representing 7/10 provinces, with a mean years-in-practice of 15.2 years (SD 9.7). All respondents were involved in resident education; 66% had a current formal educational role, such as Program Director. Results showed a universal trend towards teaching flow and management skills later in residency. Participants endorsed 35.93% of teaching strategies for the "Core of discipline" and 39.65% for the "Transition to practice" stages of training. Didactic and observational techniques were occasionally considered acceptable at earlier training stages, whereas experiential teaching techniques were skewed towards the later stages of residency. **Conclusion**: EM educators from across Canada believe that most teaching techniques for flow are better suited for the later stages of residency training, with didactic techniques more suitable earlier on. This work will inform faculty development on managerial/leadership skills teaching in the ED.

Keywords: clinical teaching, competency-based medical education, patient flow

P138

Management of opioid withdrawal: A qualitative examination of current practices and barriers to prescribing buprenorphine in a Canadian emergency department

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Introduction: The opioid crisis persists, and in the context of this urgency and new practice guidelines, the practice of buprenorphine (BUP) prescription is expanding across Canadian emergency departments (EDs). The objective of this study was to identify current knowledge, attitudes and behaviours to managing opioid use disorder (OUD) in the ED, including barriers and facilitators to prescribing BUP. **Methods**: Forty ED staff physicians were randomly invited to participate from an urban Toronto ED which recently received continuing medical education in addictions, and whose hospital established an addictions follow-up clinic. Individual semi-structured interviews with the 19 physicians who self-selected to participate were grounded in phenomenology, allowing for in-depth accounts of participants' lived experience and viewpoints on their role in addressing OUD. Thematic analysis was achieved through multiple readings; themes were coded using Dedoose software by two researchers. Themes were further organized as facilitators, barriers, and proposed solutions. **Results**: Opioid withdrawal management in the ED varied significantly between these practitioners in the same practice group. Facilitators to treating withdrawal and initiating BUP in the ED were rooted in three contributors to physician empowerment: knowledge about OUD and BUP, positive patient and provider experience with substitution therapy in the past, and exposure to physician champions to guide their practice. Systems-level facilitators included timely access to follow-up care and an available order set. Barriers included provider inexperience: missing subtle presentations of withdrawal, lacking feedback on treatment effectiveness, and reported uncertainty about the protocol from nursing staff. The ED environment also limits time to counsel effectively and discourages taking up a bed both to wait for withdrawal onset and for BUP induction. Other barriers were concerns about precipitating withdrawal, prescribing a chronic medication in acute care, and patient attitudes. **Conclusion**: This is the first study describing barriers and facilitators to addressing OUD and prescribing BUP in the ED. These findings suggest a role for home induction, involvement of allied health professionals in BUP counseling, and heightened continuing medical education. Results will inform departmental efforts across Canada to implement BUP prescribing as standard of care for patients in opioid withdrawal.

Keywords: buprenorphine, opioid, withdrawal

P139

The use of simulation in emergency medicine UGME clerkship education: A quality improvement initiative

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Introduction: Simulation is becoming widely adopted across medical disciplines and by different medical professionals. For medical students, emergency medicine simulation has been shown to increase knowledge, confidence and satisfaction. At the University of Ottawa Skills and Simulation Centre, third-year medical students participate in simulated scenarios common to Emergency Medicine (EM) as part of their mandatory EM clerkship rotation. This study aims to evaluate simulation as part of the EM clerkship rotation by assessing changes in student confidence following a simulation session. **Methods**: In groups of seven, third year medical students at the University of Ottawa completed simulation sessions of the following: Status Asthmaticus, Status Epilepticus, Urosepsis and Breaking Bad News. Student confidence with each topic was assessed before and after simulation with a written survey. Confidence scores pre- and post-simulation were compared with the Wilcoxon signed rank test. **Results**: Forty-eight third years medical students in their core EM clerkship rotation, between September 2017 and August 2018 participated in this study. Medical student confidence with diagnosis of status asthmaticus ($N = 44$, $p = 0.0449$) and status epilepticus ($N = 45$, $p = 0.0011$) increased significantly following simulation, whereas confidence with diagnosis of urosepsis was unchanged ($N = 45$, $p = 0.0871$). Treatment confidence increased significantly for status asthmaticus ($N = 47$, $p = 0.0009$), status epilepticus ($N = 48$, $p = 0.0005$) and urosepsis ($N = 48$, $p < 0.0001$). Confidence for breaking bad news was not significantly changed after simulation ($N = 47$, $p = 0.0689$). **Conclusion**: Simulation training in our EM clerkship rotation significantly increased the confidence of medical students for certain common EM presentations, but not for all. Further work will aim to understand why some simulation scenarios did not improve confidence, and look to improve existing scenarios.

Keywords: clerkship, simulation, undergraduate medical education

P140

Investigating volunteer perspectives on leading patient-centred practices in the emergency department

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Introduction: Patient satisfaction is an essential component of effective delivery of quality care in the emergency department

(ED). Frequent reflection on current practices is required to detect areas in need of improvement. The Ontario Hospital Association (OHA) outlined five 'Leading Practices' (LPs) targeted to increase patient satisfaction in this setting. The ED volunteers are a group of individuals who have unique perspectives on ED practices that are unbiased by confounders affecting patients and staff. The goal of this study was to explore the unique perspectives of ED volunteers involving what they believe will improve the delivery of patient-centered care, as well as to examine to what extent Saskatoon EDs are embracing the principles outlined in the OHA LPs. **Methods**: A two-phase mixed methods approach, with a survey followed by interviews that allowed participants to expand on survey findings was used. The pool of 45 ED volunteers was extended the opportunity to participate resulting in 36 survey responses and 6 interviews. The 13 Likert-grade survey questions were generated to align to each of the LPs and allowed room for qualitative feedback. Interview questions were generated following 15 survey responses to expand on the LPs that were rated below average. **Results**: Analysis of responses identified inefficient ED processes leading to increased waiting times, inefficient patient location, inadequate signage, a lack of physical space, unclean environments, and a lack of staff and volunteer awareness regarding spiritual care and interpreter services, perceptions of received care by patients due to long wait times and level of cultural safety training of ED staff. Themes reduced from interviews yielded common themes such as patient frustration, disorganization, uncomfortable environment, overcrowding, prolonged wait times, and patient misconception of ED processes at Site 1. Themes common to Site 2 included organization, patient-friendly environment, patient misconception of ED processes, and prolonged wait times. Additionally, the volunteers suggested a plethora of interventions that could improve the current processes in Saskatoon's EDs to make them more patient friendly. **Conclusion**: Saskatoon EDs comply reasonably well to the OHA Leading practices. Surveying ED volunteers provides important insight into current practices and areas for improvement, and should be considered at other sites to improve adherence to the OHA LPs.

Keywords: emergency department, quality improvement and patient safety, volunteers

P141

Identifying causes of delay in interfacility transfer of patients by air ambulance

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Introduction: Vast geography and low population density limit availability of specialized trauma and medical care in many areas of Ontario. As such, patients with severe illnesses often require a higher level of care than local facilities can provide and thus require an interfacility transfer to access tertiary or quaternary care. In Ontario, Ornge, a provincially run air ambulance, serves as the sole provider of air-based medical and critical care transport. Patient outcomes are impacted by the time to definitive care, yet little research about reasons for delay in interfacility transfer within Ontario has been conducted. This study aimed to identify causes of delay in interfacility transport by air ambulance in Ontario. **Methods**: Causes of delay were identified by manual chart review of electronic patient care records (ePCR). All emergent adult interfacility transfers for patients transported by Ornge between Jan. 1-Dec. 31, 2016 were eligible for inclusion. Patient records were flagged to be manually reviewed if they met one or more of the following criteria: 1) contained a standardized delay code; 2) the ePCR free text contained "delay", "wait", "duty-out", or common misspellings therein; 3) were above the 75th percentile in total transport time; or 4) were above the 90th percentile in time to patient bedside, time spent at the sending hospital, or time to receiving facility. Each trip was categorized as having delays that fall into one or more of the following categories: time-to-sending delays, in-hospital delays, and time-to-receiving/handover delays. **Results**: Our search strategy identified 1,220 records for manual review and a total of 872 delays were identified. The most common delays cited included aircraft refuelling (234 delays); waiting for land EMS escort (144); and unstable patients requiring advanced care such as intubation, procedures, or transfusion (79). Other delays included handover or delays at the receiving facility (42); mechanical issues (36); dispatch-related issues (53); environmental hazards (43); staffing issues (47); and equipment problems (38). **Conclusion**: Some common causes of interfacility delay are potentially modifiable: better trip planning around refueling, and improved coordination with local EMS could impact many delayed interfacility trips in Ontario. Our analysis was limited by number and completeness of available records, and documentation quality. To better understand causes for delay, we would benefit from improved documentation and record availability.

Keywords: delay, medical transport, prehospital care

P142

Gaps in public preparedness to be a substitute decision maker and the acceptability of high school education on resuscitation and end-of-life care: a mixed-methods study

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Introduction: When a patient is incapable of making medical decisions for themselves, choices are made according to the patient's previously expressed, wishes, values, and beliefs by a substitute decision maker (SDM). While interventions to engage patients in their own advance care planning exist, little is known about public readiness to act as a SDM on behalf of a loved one. This mixed-methods survey aimed to describe attitudes, enablers and barriers to preparedness to act as a SDM, and support for a population-level curriculum on the role of an SDM in end-of-life and resuscitative care. **Methods**: From November 2017 to June 2018, a mixed-methods street intercept survey was conducted in Ottawa, Canada. Descriptive statistics and logistic regression analysis were used to assess predictors of preparedness to be a SDM and understand support for a high school curriculum. Responses to open-ended questions were analyzed using inductive thematic analysis. **Results**: The 430 respondents were mostly female (56.5%) with an average age of 33.9. Although 73.0% of respondents felt prepared to be a SDM, 41.0% of those who reported preparedness never had a meaningful conversation with loved ones about their wishes in critical illness. The only predictors of SDM preparedness were the belief that one would be a future SDM (OR 2.36 95% CI 1.34-4.17), and age 50-64 compared to age 16-17 (OR 7.46 95% CI 1.25-44.51). Thematic enablers of preparedness included an understanding of a patient's wishes, the role of the SDM and strong familial relationships. Barriers included cultural norms, family conflict, and a need for time for high stakes decisions. Most respondents (71.9%) believed that 16 year olds should learn about SDMs. They noted age appropriateness, potential developmental and societal benefit, and improved decision

making, while cautioning the need for a nuanced approach respectful of different maturity levels, cultures and individual experiences. **Conclusion**: This study reveals a concerning gap between perceived preparedness and actions taken in preparation to be an SDM for loved ones suffering critical illness. The results also highlight the potential role for high school education to address this gap. Future studies should further explore the themes identified to inform development of resources and curricula for improved health literacy in resuscitation and end-of-life care.
Keywords: public education, public health, substitute decision making

P143

A prospective cohort study characterizing 30-day recurrent emergency department visits for hyperglycemia

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Introduction: Hyperglycemic emergencies, including diabetic ketoacidosis (DKA) and hyperosmolar hyperglycemic state (HHS), often recur in patients who have poorly controlled diabetes. Identification of those at risk for recurrent hyperglycemia visits may improve health care delivery and reduce ED utilization for these patients. The objective of this study was to prospectively characterize patients re-presenting to the emergency department (ED) for hyperglycemia within 30 days of an initial ED visit. **Methods**: This is a prospective cohort study of patients ≥18 years presenting to two tertiary care EDs (combined annual census 150,000 visits) with a discharge diagnosis of hyperglycemia, DKA or HHS from Jul 2016-Nov 2018. Trained research personnel collected data from medical records, telephoned patients at 10-14 days after the ED visit for follow-up, and completed an electronic review to determine if patients had a recurrent hyperglycemia visit to any of 11 EDs within our local health integration network within 30 days of the initial visit. Descriptive statistics were used where appropriate to summarize the data. **Results**: 240 patients were enrolled with a mean (SD) age of 53.9 (18.6) years and 126 (52.5%) were male. 77 (32.1%) patients were admitted from their initial ED visit. Of the 237 patients (98.8%) with 30-day data available, 55 (23.2%) had a recurrent ED visit for hyperglycemia within this time period. 21 (8.9%) were admitted on this subsequent visit, with one admission to intensive care and one death within 30 days. For all patients who had a recurrent 30-day hyperglycemia visit, 22/55 (40.0%) reported having outpatient follow-up with a physician for diabetes management within 10-14 days of their index ED visit. 7/21 (33.3%) patients who were admitted on the subsequent visit had received follow-up within the same 10-14 day period. **Conclusion**: This prospective study builds on our previous retrospective work and describes patients who present recurrently for hyperglycemia within 30 days of an index ED visit. Further research will attempt to determine if access to prompt follow-up after discharge can reduce recurrent hyperglycemia visits in patients presenting to the ED.
Keywords: emergency medicine, hyperglycemia, recurrent visits

P144

"I wasn't oriented a lot, so I'm essentially learning as I go": onboarding and transition to practice of new emergency physicians

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Introduction: Transition to the attending physician role and onboarding at a new workplace are often stressful. Effective initiation is important to individuals as well as departments, hospitals and universities wishing to retain valuable staff. Our aim was to learn about early experiences from the perspective of new staff and apply these findings to develop a new onboarding program. **Methods**: Following a pilot study of individual interviews, we surveyed and conducted focus group interviews with all attending physicians who had joined our dual site, urban, academic emergency department within three years. We used a mixed quantitative and qualitative approach to collect and analyze data. We applied the data to develop a new needs-based formal onboarding program. **Results**: 24/36 participated in the survey, 22/36 in focus groups. 95% were 30-39 years old. Newcomers described the existing orientation as too brief, non-specific, and missing essential elements. We identified six onboarding themes: (1)clinical protocols and reference documents, (2)graduated responsibilities, (3)mentorship, (4)relationship building, (5)department structure and culture, and (6)emotions. We formed a committee to develop and implement these initiatives: (1)a new online platform enables easy access to clinical care and orientation documents, (2)a formal mentorship program matches each newcomer with 2 mentors to coach towards goals, navigate department structure and culture, and provide perspective to mitigate strong emotions, (3)adjusting shift and teaching assignments allows newcomers to ease into clinical and academic responsibilities, and (4)our next priority is to improve clarity around academic opportunities, expectations, and advancement. **Conclusion**: New emergency physicians are highly engaged and provided many insights on their orientation experiences. Using mixed methods, we identified six themes to guide the design and implementation of a program to promote successful integration of newcomers.
Keywords: onboarding, transition to practice

P145

Orthomageddon: An epidemiological analysis of weather-dependent mass-casualty incidents in a Canadian city

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Introduction: Unique weather patterns on March 16th, 2017 led to 3 times the number of emergency department (ED) visits due to fall-injuries (FIs) on snow or ice compared to winter averages. The objective of the study was to identify weather-dependent differences in demographics, length-of-stay (LOS) predictors, and volume of ED presentations for winter FIs. We placed emphasis on Chinook phenomenon (rapid freeze-thaw cycles) common east of the Rocky Mountains. **Methods**: Patients with extremity injury due to fall on snow or ice were identified from the Alberta Health Services ED database from November 1st 2013 to March 31st 2018. We conducted regressions, chi-square analysis, bivariate correlations, and t-tests to identify differences in post-Chinook, high-volume, and regular winter patient cohorts. High-volume dates included any date with more than 25 FI presentations, representing a 400% increase from the daily average of 5. **Results**: We identified 3478 patients, with females more likely to present, $X2\ (1, N = 3480) = 443.266$, $p < 0.001$, making up 67.8% of the total cohort. Mean age was 48.2 (SD ± 19.9) in all patients, and 48.4 (SD ± 20.0) among the post-Chinook cohort. Looking at ED LOS in the full patient cohort, age over 65 predicted longer ED LOS (mean = 4.23, SD ± 3.06) compared to younger age groups (mean = 3.42, SD ± 2.39), $t(3478) = -7.37$, $p < 0.001$]. Patients with

fractures to the wrist or hand had shorter ED LOS (mean = 2.50, SD ± 5.83) than those without (mean = 10.95, SD ± 92.54), t(3478) = 2.64, p = 0.008. Among admitted patients, results were similar, with elevated inpatient LOS for patients over the age of 65 (mean = 171.71, SD ± 508.35) compared to younger patients (mean = 45.45, SD ± 39.53), t(3478) = −3.41, p = 0.001. Patients with radius fractures had shorter LOS (mean = 61.87, SD ± 210.37) compared to those without (mean = 288.83, SD ± 632.29), t(3478) = 3.87, p < 0.001. With respect to volume and weather, night-freezing events (below-freezing temperatures the preceding day, followed by freezing temperatures prior to 0600 hours the following day) were more likely to result in high FI volume (OR, 8.08; 95% CI, 5.14, 12.07; p < 0.001) as were recent Chinook events (OR, 1.39; 95% CI, 1.06, 1.81; p = 0.017). **Conclusion**: Chinook-induced meteorological mass-casualty events can be severe, but do not target populations distinct from winter averages. They can be predicted based on forecasted weather variations and should be considered for population-level alerts utilizing cellular technology.

Keywords: fall, mass-casualty incident, weather

P146

Does a communications skills intervention improve emergency department staff coping skills and burnout?

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Introduction: Emergency department (ED) staff carry a high risk for the burnout syndrome of increased emotional exhaustion, depersonalization and decreased personal accomplishment. Previous research has shown that task-oriented coping skills were associated with reduced levels of burnout compared to emotion-oriented coping. ED staff at one hospital participated in an intervention to teach task-oriented coping skills. We hypothesized that the intervention would alter staff coping behaviors and ultimately reduce burnout. **Methods**: ED physicians, nurses and support staff at two regional hospitals were surveyed using the Maslach Burnout Inventory (MBI) and the Coping Inventory for Stressful Situations (CISS). Surveys were performed before and after the implementation of communication and conflict resolution skills training at the intervention facility (I) consisting of a one-day course and a small group refresher 6 to 15 months later. Descriptive statistics and multivariate analysis assessed differences in staff burnout and coping styles compared to the control facility (C) and over time. **Results**: 85/143 (I) and 42/110 (C) ED staff responded to the initial survey. Post intervention 46 (I) and 23(C) responded. During the two year study period there was no statistically significant difference in CISS or MBI scores between hospitals (CISS: (Pillai's trace = .02, F(3,63) = .47, p = .71, partial η2 = .02); MBI: (Pillai's trace = .01, F(3,63) = .11, p = .95, partial η2 = .01)) or between pre- and post-intervention groups (CISS: (Pillai's trace = .01, F(3,63) = .22, p = .88, partial η2 = .01); MBI: (Pillai's trace = .09, F(3,63) = 2.15, p = .10, partial η2 = .01)). **Conclusion**: We were not able to measure improvement in staff coping or burnout in ED staff receiving communication skills intervention over a two year period. Burnout is a multifactorial problem and environmental rather than individual factors may be more important to address. Alternatively, to demonstrate a measurable effect on burnout may require more robust or inclusive interventions.

Keywords: burnout, emergency department

P147

Your emergency department journey: piloting a patient poster explaining the emergency department care process

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Introduction: Qualitative research with emergency department (ED) patients in Alberta has revealed that some patients have limited understanding of the ED care process and that this increases the anxiety, frustration and confusion experienced throughout their visit. The objective of this study was to design, implement, and test the usefulness of a poster explaining the ED care process. **Methods**: As part of a stepped-wedge ED intervention trial in Alberta, a 4′ x 3′ poster portraying the patient ED care process was developed and posted in 15 study site waiting rooms. Trained research assistants approached patients in 3 urban ED waiting areas and invited them to complete a short paper-based survey on the acceptability and usefulness of the poster. Results are reported as proportions. **Results**: A total of 316 patients agreed to participate in this study. Approximately half of the participants were male and 60% were between the ages of 17 and 49. The majority of participants identified themselves as white (72%) and nearly half (49%) were accompanied by someone. A third (37%) of patients had read the wall poster prior to being approached to complete the survey. Most patients (62%) who had not read it prior to being approached hadn't noticed the poster or couldn't see it because of its location. Once patients reviewed the poster, the vast majority (92%) reported completely or largely understanding the information and most (84%) found it at least moderately helpful in preparing them for their ED journey. Approximately 45% of respondents agreed that they learned something new about the ED care process by reading the poster and 20% wanted additional information added to the poster; largely, wait time estimates (53% of responses). **Conclusion**: Placing posters in the ED is one method for equipping patients for their ED care process; however, this study revealed the potential limited utility of this engagement method by the small number of patients who noticed the poster and read the information. Location and content (e.g., time estimates) were identified as key factors for implementation. Condition-specific guides may need to supplement general ED process guides to better prepare patients for their individual ED journey and to actively engage them in their ED care.

Keywords: care process, emergency department, patient education

P148

Emergency physicians' perception on engaging patients in their emergency department care

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Introduction: Patient engagement in health decision-making is an important research area within emergency medicine. Studies suggest that patients are often not highly engaged in care decisions, and may not be aware that there are decisions in which they can be involved. This study explored emergency physicians (EPs) perceptions of their patient engagement practices. **Methods**: As part of a stepped-wedge randomized controlled trial, an introductory seminar was

held at 15 emergency department (ED) sites in Alberta. Seminars highlighted physician-patient communication and expectation gaps documented in local studies. As part of the seminar evaluation, EPs were asked to reflect on their engagement of patients in their practice. Descriptive results are reported. **Results**: A total of 114 EP surveys were returned. The majority of respondents were male (68%) and nearly 40% of respondents have practiced emergency medicine for 5 years or less. Less than half of the EPs (43%) reported always or usually asking their patients about their ED visit care expectations. Approximately one-third (32%) reported always or usually checking their patients' understanding of management options (e.g., tests, treatments and/or procedures). Patients management preferences were always or usually elicited 24% of the time. Despite limited consistency in ascertaining patients' preferences, 39% of EPs indicated that they always or usually considered their patients' preferences when choosing a management plan. Half of the EPs (51%) reported that they always or usually involved their patients in decision-making. Yet, when asked whether other EPs involved their patients in decision-making, only 15% reported that they believed their fellow clinicians did this always or usually. On average, 68% of respondents believed their patients wanted to be completely or mostly involved in their ED and decision-making; however, 16% believed patients were actually completely or mostly involved in the ED care and decision-making. **Conclusion**: EPs agreed that patients want to be actively involved in their ED care decisions. Yet, their reflection on their own practice, and especially their perception of their colleagues', highlight large gaps between physicians' perception of what patients would like and what patients actually receive. Further research should explore these interactions in depth, understand what constrains EPs from involving patients and explore patient perceptions of these interactions.

Keywords: decision-making, patient engagement

P149

Benign headache management in Alberta emergency departments: a chart review study to explore gaps in practice

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Introduction: Variation in medication management and image ordering for HA presentation to emergency departments (ED) has been documented. This study examined benign HA (i.e., migraine, cluster, tension) management in order to identify the consistency and appropriateness of HA management in EDs in Alberta. **Methods**: Patients were identified by primary discharge diagnosis in the National Ambulatory Care Reporting System using ICD-10-CA codes for benign HA (G43, G44, R51). Patients presenting to study sites from January 1, 2017 to September 30, 2017 were eligible for inclusion, provided they were adults (≥18 years), were not transferred from another institution or directly admitted to a service, and had an active HA at presentation. One hundred eligible patients were randomly selected for chart review. Data were extracted on standardized forms. Preliminary data on 50 patients (n = 150) from three Edmonton study sites is presented. **Results**: Most patients arrived to the ED via personal transportation (93%) and were assigned a Canadian Triage and Acuity Scale (CTAS) score of 3 (71%). The majority of patients were female (75%); mean age was 45 years (standard deviation: 18). Triage pain score was not documented for 21%. When documented, pain scores were most frequently between 4 and 7 (49%). Nearly 10% of patients left without being seen. For those who were assessed, physicians most frequently used ketorolac and metoclopramide as first or second line treatments or as a combination treatment. Consults were infrequent (14%). Nearly half of the patients (47%). had computed tomography (CT) in the ED. Pain re-assessment was completed for 69% of patients. Most patients were discharged from the ED (88%) and given some form of discharge instruction (78%). The most common instructions were to return to ED as needed (45%) and follow-up with their primary care physician (28%). Across all patients, 13% returned to the ED with headache within 30 days. **Conclusion**: Physicians treat patients with benign headaches appropriately and hospitalization is infrequent; however, one in eight patients relapse. Missing pain scale documentation reveals a potential problem for ED clinicians in assessing management effectiveness and ensuring patients leave the ED following pain relief. Half of the patients received a CT scan, highlighting the urgent need for an intervention to address CT overuse for patients with benign HA within this geographic region.

Keywords: benign headache, computed tomography

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Sincerely,
Andrew McRae, MD, PhD

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