2019 Emergency Medicine Research Day

Submitted Abstracts

Tona Laerz | James Huffman - ORAL

Laerz T, Huffman JL.

Airway Management Pause

Introduction: Historically, communication practices during airway management in Calgary adult emergency departments were not standardized. Airwayanagement can be a high stress and high cognitive load situation. Anecdotally, it was noted that typical communication practices involved silos of communication between the members of the multidisciplinary team and the team as a whole most often did not exchange information prior to the event start. This contributes to opportunities for communication errors and omissions which contribute to adverse events. "Communication failures are the leading cause of inadvertent patient harm." (Leonard, Graham, & Bonacum, 2004) The Joint Commission for Hospital Accreditation found that in 70% of 2455 sentinel events the primary root cause was communication failure and in 75% of those the patient died. (Leonard, Graham, & Bonacum, 2004) Our objective was to introduce a standardized communication tool, the Airway Management Pause, to support team communication and function, to guard against some of the errors that can occur during airway management, as well as to reduce cognitive load and stress.

Methods: After training emergency department staff on the use of the AMP, the tool was implemented. Its use was discretionary according to the preference of the physician involved in the case. For a period of one year, emergency department airway management team members (RRTs, RNs and MDs) were asked to complete a team survey following every airway management event. Further, Emergency Medicine Research Assistants who underwent rater training and standardization were paged to observe and rate all airway management events that occurred between 8am and 8pm at the Foothills Emergency Department over an overlapping six-month period. Outcomes assessed included team effectiveness scores, frequency of role-assignment and a rating of environmental chaos. Statistics compared events in which the AMP tool was used to those when it was not. Additionally, results obtained through surveys of the team members were compared to those obtained through the trained raters.

Results: A total of 507 team surveys were collected over the study period. The trained observers rated 88 airway management events. In the team surveys, the AMP was used 387 times, the team paused but did not use the tool 40 times and there was no pause 76 times. During the observer rated events, the AMP was used 54 times, the team paused but did not use the tool 16 times and there was no pause 17 times. The mean team effectiveness scores from the self-reported team surveys was 15.56 when the AMP was used and 13.02 when it was not. The observers found a similar trend with mean team effectiveness scores of 14.06 when the AMP was used and 9.35 when there was no pause. The scores are out of 16. There was also a statistically significant difference for the total team effectiveness score between the team members and the observers ($p < 0.001$). Roles were assigned more often when the AMP was used than when it was not in both the team surveys and the observer data. Team members responded that roles were clearly identified 98.7% of the time when the AMP was used versus 75% of the time when the AMP was not used. Team members and observers were more likely to rate the environment as chaotic or frantic when the AMP was not used or when the team paused but did not use the checklist, than when the AMP was used.

Conclusions: The Airway Management Pause (AMP) tool was used in the majority of the events captured during the study period. The data obtained in this study is correlative so causation cannot be discerned. However, the use of the AMP was associated with higher team effectiveness scores, roles being explicitly delineated more often, and a calmer environment according to both the team surveys and the independent observers. The results suggest that the tool may be beneficial in the high stress situations of airway management.

Rebecca Hartley - ORAL

Hartley R, Fraulin F, Robertson Harrop A, Faris P, Wick J, Ronksley P.

Calgary Kinds Hand Rule – Development and Internal Validation of a Prediction Model for Acute Pediatric Hand Fracture Triage

Introduction: Referrals of acute pediatric hand fractures to hand surgeons are common, costly, and possibly unnecessary. An easy-to-use tool to quantify necessary referral would help clinicians identify patients who might benefit from referral and who might be appropriate for an alternate level of care provider. Our objective was to derive and internally validate a prediction model to aid Emergency Department (ED) physicians in determining necessary referral of acute pediatric hand fractures.

Methods: In a cross-sectional study, 21 variables were collected in patients 17 years and younger with a radiographically confirmed hand fracture who were consecutively referred to the Alberta Children's Hospital hand clinic in Calgary, Alberta over two years (January 2013 - December 2014). The primary outcome was necessary referral, defined as any of (1) surgery, (2) closed reduction or (3) four or more hand surgeon appointments. We used multivariable logistic regression with bootstrapping to derive and internally validate an index to predict fracture acuity. Model discrimination was assessed by an optimism-adjusted c-statistic and calibration by deciles of risk and calibration slope.

Results: Of 1,173 hand fractures, 417 (35.6%) met criteria for necessary referral. A risk index was created with points assigned to six strong predictors based on their regression coefficients: open fractures (2 points), malrotation (3 points), displacement (0-2 millimeters = 1 point, 2 millimeters = 2 point), angulation (0-5 = 1 point, 5 = 2 points), dislocation (3 points), and condylar involvement (1 point). Point scores ranged from 0 (4.12% expected risk of referral) to 11 (100% expected risk). A scatterplot of points score versus referral revealed a concave curve flattening out at 6 points (84.44% expected risk), with maximum expected risk (100%) at 8 points and above. Model discrimination was strong (C-statistic: 0.86) and calibration was good except at the lowest risk deciles.

Conclusion: We derived and internally validated a prediction model for necessary referral in acute pediatric hand fractures. While these results require external validation prior to use in clinical practice, this tool may help identify high risk patients and allow for targeted referral, thus avoiding unnecessary referral.

Patrick McLane - ORAL

McLane P, Scott K, Suleman Z, Deol J, Fanaeian J, Olmstead A, Ross M, Hair H, Holroyd BR, Dong K, Lang E, Biggs C, Ghosh M, Tanguay R, Fisher A, Fielding S.

Implementing Buprenorphine/Naloxone in Emergency Departments for Opioid Agonist Treatment: A Quality Improvement Initiative

Introduction: 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. 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.

Methods: 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 utilized. We used administrative data to track the number of patients given bup/nal in the 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.

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. Of the 60 unique patients, 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. In addition, EDs referred 37 patients with OUD, with or without bup/nal initiation, to the 3 participating community clinics. 16 of those individuals (43%) attended their first community follow-up appointment.

Conclusion: 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.

Ian Blanchard - ORAL

Blanchard I, Ronskley P, Lane D, Niven D, Quan H, Williamson T, Hagel B, Dean S, Lazarenko G, Doig C, Lang E.

Linkage of Emergency Medical Services Patients to Health System Outcomes: A comparison of two approaches.

Introduction: Linking Emergency Medical Services (EMS) patients to their health system outcomes is critical to informing paramedic care. Limited research exists on EMS data linkage, especially reducing selection bias from non-linkage. Patient groups such as trauma and cardiac arrest may have higher non-linkage due to missing or incomplete patient identification information. The purpose of this study is to describe the linkage rate and characteristics of unlinked patients using the current strategy employed by an EMS system and an optimized strategy

Methods: A random sample of 4,150 EMS events was created from a fiscal year of data (2016/2017) within a metropolitan centre of 1.2 million people. These patient level data were linked to the National Ambulatory Care Reporting System (a national health information repository), using the current deterministic strategy of a unique provincial health number, hospital and date/time of arrival. Patients not linked using this strategy underwent linkage optimization consisting of deterministic linkage to Sunrise Clinical Manager (a local emergency department repository), using provincial health number, name, date of birth, sex, hospital record number, hospital, and date/time of arrival. All linkages were reviewed manually to ensure no false positive links. Descriptive statistics are provided.

Results: The current strategy resulted in 3,650 out of 4,150 (88.0%) linked records (95% CI 86.9%, 88.9%). Of the 500 non-linked records, a further 381 were linked using the optimized strategy, which improved the linkage rate by 9.1% (97.1%; 95% CI 96.6%, 97.6%). There were no instances of false positive linkages in either strategy. The highest proportion of linkage failure with the current strategy occurred in 25 to 34 year olds (n=93/478, 20%), Echo level events (n=15/77, 20%), penetrating trauma (n=6/17, 35%), cardiac arrest events (n=12/46, 26%), and events involving emergency (lights and siren) transport to hospital (n=45/231, 20%). The optimized strategy improved linkage in these groups by 64/93(69%), 6/15(40%), 5/6(83%), 5/12(42%), and 23/45(51%) respectively.

Conclusion: The current linkage strategy results in exclusion of patients from important subgroups. This selection bias can be reduced by employing the optimized linkage strategy. Selection bias due to linkage should be considered by end-users of linked EMS and health system data, particularly among key patient subgroups.

Catherine Patocka - ORAL

Patocka C, Cheng A, Sibbald M, Duff J, Lai A, Lee-Nobbee P, Levin H, Varshney T, Weber B, Abedin T, Bhanji F.

What is the effect of a spaced instructional design on pediatric resuscitation performance?

Introduction: Resuscitation is a life-saving intervention provided by healthcare providers (HCP) in which survival is directly related to the quality of resuscitation. HCP completing resuscitation courses demonstrate significant decay of skills in the weeks to months following training. Self-efficacy, which is the belief in one's capability to organize and execute a course of action, may play an important role in our understanding of resuscitation performance as it correlates with performance of critical life-saving skills. It may also be a predictor of the application of learning. Preliminary studies suggest that spaced training conditions may result in improved longer-term self-efficacy in resuscitation. The purpose of this study was to determine if a pediatric resuscitation taught to experienced Emergency Medical Services providers (EMS) in a spaced format, compared to the usual massed instruction, results in improved self-efficacy in resuscitation.

Methods: We delivered a Pediatric Advanced Life Support (PALS) course to EMS providers in either a spaced (four 3.5-hour weekly sessions) or the usual massed course format (two 7-hour sessions over 2 consecutive days). Self-efficacy was measured pre-, post- and 12-weeks post-course using a visual analog scale (VAS) with prior validity evidence.

Results: Forty-eight out of 50 participants completed the study protocol (26 spaced, 22 massed). The spaced and massed groups had similar baseline self-efficacy scores (53.2 +/-3.2 mm versus 57.4 +/-3.4mm, p=0.56) and demonstrated improvement in their self-efficacy immediately post-course (83.9 +/-1.7 mm versus 79.5 +/-1.9 mm, p=0.15). However at 12 weeks post-course there was a significant difference in the mean VAS score for self-efficacy of the spaced group compared to the massed group (71.8 +/-2.4 mm versus 63 +/-2.6 mm, p=0.04).

Conclusion: Our study suggests that self-efficacy improves as a result of training in pediatric resuscitation regardless of instructional design; however, there is an important decay in self-efficacy in the weeks to months following a resuscitation course taught in a massed format which is less prominent when taught in a spaced format.

Grant Innes - ORAL

Innes G, McRae A, Law M, Weber B, Carlson K, Andruchow J.

What patients need early surgical intervention for acute ureteric colic?

Introduction: Utilization of CT imaging has risen dramatically with increases in availability, but without corresponding improvements in patient outcomes for many clinical scenarios. Previous attempts to improve imaging appropriateness have met with limited success, with commonly cited barriers including a lack of confidence in patient outcomes, medicolegal risk, and patient expectations. The objective of this study was to assess the impact of an electronic clinical decision support (CDS) intervention to reduce CT utilization for emergency department (ED) patients with mild traumatic brain injury (MTBI).

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 management 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%) 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..

Katrina Koger - ORAL

Koger K, Chan H, Brubacher J, Wishart I.

The prevalence and pattern of drugs detected in injured drivers in four Canadian provinces: A focus on Alberta

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, and in this abstract, focus on preliminary results collected from Alberta.

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 2trauma centres in Alberta (AB), 1 in Saskatchewan (SK), and 2 in Ontario (ON) in 2018. In preliminary results from Alberta, 265 drivers (74 Females, 191 Males) were included in the analyses. The Average age of the drivers was 41.3 (SD=1 7.4) with a median age of 38. n this sample, 52 (19.6%) injured drivers were positive for THC and 69 (26.0%) for carboxy-THC. Among the 52 THC positive drivers, 23 (44.2%) also tested positive for alcohol, 22 (42.3%) were above 0.05%, 11 (21.2%) tested positive for Recreational Drugs (cocaine, opiates, and/or amphetamine) and 13 (25.0%) tested positive for Impaired medication (benzodiazepines, antidepressants, tricyclic antidepressants, anti psychotics, anticonvulsants and/or z-drug). 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.

Nikita Arora (Presented by Dr. Eddy Lang on Research Day) - ORAL

Arora N, Arinde F, Lang E, McDonald S, Manji S, McCracken L, McLeod L

Development of provincial recommendations for domestic violence screening in Emergency Departments and Urgent Care settings in Alberta

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).

Adam Oster | Jennifer Jordon – QI KEYNOTE TOPIC

Oster A, Jordan J.

Expedited EMS to ED Transfer: A Quality Improvement Project

Introduction: Patients who arrive to a Calgary Zone ED via EMS and are felt not to require urgent assessment by an ED Physician may be moved to a hallway where they are cared for by EMS. Patients may not be seen in a timely manner by an ED MD and may have a delay in the completion of orders. Many will experience diagnostic and management delays and are disadvantaged by their placement in this treatment location. They are at increased risk of adverse events. Indeed, the AHS Reporting and Learning System is replete with examples of adverse patient events, encompassing the spectrum of close calls to patient harm, that have occurred at least in part due to the provision of care in this location. This Quality Improvement Study at the FMC ED will test the coordinated implementation of multiple process changes with the main study aim to reduce the Transfer of Care (TOC) to 30 minutes for ninety percent (P90) of EMS Patients by 90 days into the study period.

Methods: On December 4, 2018, multiple process changes were simultaneously implemented at the FMC ED. Process changes were consensus selected by a core change team of MDs, RNs and EMS providers with content expertise in this area. The process changes were specifically designed to improve the input of EMS patients. An EMS Timer was added to the patient Tracking Board. Other processes were enhanced to expedite input of EMS Patients. Balancing measures were also tracked to identify any potential unintended consequences.

Results: Preliminary results demonstrate an improved P90 TOC with no unintended adverse events. Continued analysis of these process changes continues.

Conclusion: The co-ordinated implementation of several process changes and the addition of personnel facilitating these process changes can substantially decrease the P90 TOC time between EMS and an ED Care Space. Balancing measures have yet to detect added risk to patients as a result of these process changes. Identifying the key process changes from the many simultaneously implemented is challenging. Ensuring the sustainability of this quality improvement is a subsequent challenge as is scaling of this improvement to other Calgary Zone EDs.

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Emily Boucher - POSTER

Boucher E, Rosgen B, Lang E.

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

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 I^2 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, I^2 = 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, I^2=53%) compared to -0.35 (95% CI -0.86 to 0.17, I^2=60%) for intramuscular injection. Improvements in mobility were observed at week 4 (SMD -0.48, 95% CI -0.79 to -0.17, I^2=45%). The risk of adverse events was increased with calcitonin (Risk Ratio 2.72, 95% CI 0.90 to 8.17, I^2=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.

Gudrun Reay - POSTER

Reay G, Rankin JA, Then KL, Smith-MacDonald L, Hall M.

Emergency Department Registered Nurse Triage Decision Making: The Development of a Triage Decision Making Instrument.

Introduction: Triage Registered Nurses (RNs) make decisions that control patient access and flow through the Emergency Department (ED), affect patient safety, and the efficient management of ED resources1,2. Given that decisions made by triage RNs impact patient safety and ED flow, it is vital to understand how these decisions are made. We describe the first steps in developing a robust psychometric instrument; the triage decision-making instrument (TDMI), to measure those factors that triage RNs consider when making decisions. The TDMI is unique in that the intent is to understand and quantify how triage RNs make decisions, not how they ought to make decisions.

Methods: Preliminary phase methodological instrument development. We developed an initial set of 89 items representing four domains of triage decision-making (DM): determining acuity, anticipating needs, managing space, and creating space. The domains are derived from the authors' previous grounded theory research, the literature, and clinical experience. Three focus groups were conducted with triage RNs (n = 12) who evaluated each item with respect to how well it represented triage DM. The items were revised and an online survey was developed containing 89 items together with the definition of each domain. Three content and/or psychometric tool development experts were asked to identify the domain represented by each item and to rate each item for 'goodness of fit' with its respective domain.

Results: Preliminary results revealed that 44 items were rated as having a 'good fit' and were assigned to the correct domain by the three expert judges. They deemed that an additional 13 items were a 'good fit', however only two out of three judges assigned the items to the correct domain. Thirty items were deemed "poor" either because of a "bad fit" (16 items) or only one judge was able to identify the correct domain (14 items). Interestingly, the items associated with the domains "anticipating needs" and "managing space" were most difficult for the judges to match correctly. In contrast, the focus group triage RNs were able quickly and accurately identity the difference between these domains. The results pose an interesting question as to whether the domains actually overlap or the key differences between the domains are knowable only to triage RNs.

Conclusion: The investigators are conducting further item analysis. The final selection of items will be pilot tested by triage RNs from four EDs in Alberta during the winter of 2019 using an online version of the TDMI.

Jabin Binnendyk - POSTER

Binnendyk J, Prowse-Turner J, Blanchard I, Oddie S

Exploratory study of the road to mental readiness program within Emergency Medicine

Introduction: Occupational Stress Injuries (OSIs), like post-traumatic stress disorder, among Emergency Medical Services (EMS) personnel produce a public-safety concern and negatively impact resiliency and workplace mental health. In response, the Mental Health Commission of Canada modified and deployed a program created by the Canadian military called Road to Mental Readiness (R2MR), which has seen widespread implementation among some EMS services. The R2MR program aims to enhance resilience and help-seeking behaviours while reducing stigma, although sparse empirical evidence currently confirms its effectiveness. PURPOSE: To determine if R2MR retention produced differences in resilience, help-seeking behaviours, and stigma.

Methods: An on-line survey was made available to all operational and management personnel in a provincial EMS system servicing approximately four million people. Retention of R2MR was defined as the ability to recall R2MR components and assessed using knowledge-based questions while resilience, help-seeking behaviours, and stigma utilized pre-existing validated measurements (Brief Resilience Scale, Mental Health Service Use Questionnaire, and Mental Health Knowledge Schedule respectively). A correlational design using analyses of variance, and t-tests were used with statistical tests considered significant at an alpha of 0.05.

Results: Three hundred and ninety (390) participants fully completed the survey with another 265 partial respondents. The vast majority of participants were Caucasian (93.5%); however, gender (49.6% male, 48.4% female), level of certification (50.7% Advance Care Paramedic, 30.8% Primary Care Paramedic, 14.2% Emergency Call Officer), and geographical location (52% metropolitan, 30.2% rural, 16.2% suburban) were heterogeneous. The high R2MR retention group reported increased resiliency (p = 0.042; 95%CI 0.06, 2.91) and help- seeking behaviours (p = 0.047; 95%CI 0.02, 3.84) along with reduced stigma (p < 0.001; 95%CI -2.95, -0.51) in comparison to the moderate retention group. No significant differences between low and moderate retention groups were found and R2MR retention and regency of receiving the training was nonsignificant.

Conclusion: High retention of the R2MR program was correlated with preventative (increased resilience and reduced stigma) and reactive (increased help-seeking behaviours) protections helping combat OSIs. Although causality should be further explored, this study enhances EMS leadership's ability to understand the scope of impact produced by R2MR on mental health in EMS personnel.

Simone Kortbeek - POSTER

Kortbeek S, Dhillon B, Lee A, Brindle M, Eccles R, Martin D, Vogel H, Hancock B, Thompson G.

Gene Expression Profiling in Pediatric Appendicitis

Introduction: Measurement of messenger ribonucleic acid (mRNA) in blood can demonstrate specific patterns of gene expression characterizing a host's response to acute illness. Transcriptomic analysis offers a unique opportunity to identify classifier genes active in children with suspected appendicitis. Our objective is to identify gene expression profiles that accurately differentiate children presenting to the Emergency Department (ED) with abdominal pain and a) simple appendicitis (SA) or b) perforated appendicitis (PA) from those with non-appendicitis abdominal pain (NAAP).

Methods: We enrolled children aged 5 to 17 years presenting to the ED at the Alberta Children's Hospital with abdominal pain and suspected appendicitis (ultrasound or surgical consult ordered). Whole blood was collected in Tempus RNA tubes; then RNA was extracted, followed by polyA-enrichment, stranded cDNA library synthesis and high throughput sequencing on an Illumina HiSeq 2500. The median sequencing depth was 8 million reads, with a range of 2-150 million reads. Single-end reads of 100 bp were aligned to the human reference genome (GRCh 38.92) using STAR and total counts were compiled using HTSeq. DESeq2 was used to identify differentially expressed (DE) genes between the groups (absolute log fold change ≥ 1.5 and an adjusted p-value < 0.05).

Results: Samples from 72 children were analyzed; 34 with SA, 13 PA, 25 NAAP. Of these, 48 were males and 24 were females and the mean age was 11.8 years (SD 2.9). Twenty-seven DE genes were identified between SA and NAAP samples, of which 15 down-regulated genes were in the classical antibody-mediated complement activation pathway. When comparing PA to NAAP, 885 significant DE genes were identified indicating greater transcriptional differences that were associated with progression to PA. Preliminary pathway analysis revealed changes in signaling pathways (including interferon, PTK2, PDGF, tyrosine kinases), and possible alternative metabolism pathways (including collagen degradation/biosynthesis, transport of vitamins).

Conclusion: Transcriptomic analysis of patients with suspected appendicitis provided insights into the functional mechanisms of progression to SA and PA, and could inform improved clinical practices, including diagnostic tools and potential biological targets in the management of this common childhood illness. Larger, multi-site studies are needed to validate these results and minimize confounding factors influencing gene expression in pediatric appendicitis.

UNIVERSITY OF CALGARY
CUMMING SCHOOL OF MEDICINE

Alberta Health Services

Ashley Murakami - POSTER

Murakami A, Smith J, Hodder M, Leckie L, O'Shaughnessy L, Heward A.

Improving time to ECG for patients presenting to Rockyview General Hospital Emergency Department

Introduction: Timely ECG for patients presenting to the Emergency Department (ED) with cardiac chest pain/type pain is important in the early identification of STEMI patients. ACLS and STEMI guidelines state that a 12 lead ECG should be completed within 10 minutes of the patient arrival to the ED. Historically, achieving this guideline had been met with barriers including delays to assessment space or resource limitations, resulting in a median of 7% of patients meeting this target across the Calgary Zone. In 2017, Foothills Medical Center (FMC) ED implemented a new process to obtain early ECGs utilizing a stretcher at triage, resulting in a median of 31% of patients receiving an ECG within 10 minutes compared to 6% pre-implementation. In early 2018, only a median of 3% of patients presenting to Rockyview General Hospital (RGH) ED with cardiac chest pain/type pain received an ECG within 10 minutes of arrival; the median triage to ECG time was 36 minutes. Therefore, RGH ED ventured to build upon the work started by FMC ED. Project objectives aimed to meet the 10 minute triage to ECG target 35% of the time three months post-implementation, and 50% 6 months post-implementation.

Methods: Stakeholders were engaged, which included ED physicians, nurses, patient registration and ECG. Key implementation strategies included planning and vetting the process through the ED Unit Council, as well as establishing a dedicated space, role and communication methods to facilitate this process. Space was leveraged from an existing curtained area near triage and the chest pain nurse role was added within the existing staffing model. In April 2018, staff education was completed over a one month span utilizing existing staff recertification sessions, and in May 2018, the chest pain nurse and stretcher process was implemented. Patients presenting with cardiac chest pain/type pain were triaged and immediately sent to the ECG stretcher. The ECG and nurse initiated chest pain protocol were completed and any ECG changes were reviewed with an ED physician. Following ECG, patients were located to an appropriate care space for ongoing care.

Results: Post-implementation, median triage to ECG times and percent of visits meeting the 10 minute target were analyzed weekly utilizing a Tableau dashboard. Results were shared with staff and key stakeholders using various mediums. As of June 2018, just one month into the process, RGH ED saw a decrease in median triage to ECG time from 36 minutes pre-implementation to 7 minutes post-implementation, and an increase in patients meeting the 10 minute target from 3% to 75%. During months three and six post-implementation, these successes were sustained, with median triage to ECG times of 8 and 7 minutes respectively, and 72% and 80% of patients receiving an ECG within 10 minutes of ED triage, respectively.

Conclusion: The success of the Chest Pain Nurse/Stretcher Project has far exceeded its original objectives, resulting in an effective sustained process change at RGH ED. Current data from December 2018 shows a median time of 7 minutes, with 76% of patients obtaining their initial ECG within 10 minutes. This success can be attributed to ongoing stakeholder engagement, staff recognition of the direct benefits to patient care and safety, and positive reinforcement from witnessing "good catches" such as STEMI patients that may not have been identified as quickly before this process was implemented. Based on these successes RGH ED staff are empowered to strive for continual improvements in caring for cardiac chest pain/type pain patients. Recent optimizations to this process include streamlining the paging process so that ECG and the Chest Pain Nurse are notified via a single page, as well as optimizing the physical space. Next steps in this improvement journey will include addressing triage to transport times, which is the next ACLS timestamp in the patient's care continuum.

Daniel Gold - POSTER

Gold D, Wilde A, Wong C.

Integration of evidence-based strategies to enhance learning through examination.

Introduction: The use of examination as an educational tool to enhance learning has become increasingly popular over the last few years. Although there is sufficient evidence to support examination as a means of retrieval practice, only a minority of surveyed residents actually use this method. Barriers to exam banks were cost, time-restraints and that multiple choice questions were not applicable to clinical practice. These identified gaps made us question how these systems could be improved. Our goal is to integrate high yield, evidence-based learning strategies into an online examination system that would be easily accessible, improve knowledge retention and application of consolidated knowledge, and be used as a resource for emergency medicine certification exams.

Methods: We reviewed current literature for educational strategies with specific interest in learning through retrieval practice. There was strong evidence for spaced-repetition, interleaving, student self-assessment with reflective-knowledge building, stress inoculation, and testing utilizing short-answer and multiple-choice examination. We designed and developed a free open access emergency medicine examination system that utilizes spaced-repetition of questions with variable frequency based upon numerical scores, as a surrogate for comprehension. Users can also save questions for review and have question-specific email reminders in spaced intervals to minimize forgetting. Interleaving questions of different topics, as well as using short-answer questions, better reflects application of knowledge on shift when immediate retrieval is required. The exam format, including timed questions, is designed to replicate board examinations, facilitating stress-inoculation in a safe environment, with the goal of reducing test anxiety. The self-marking system encourages self-assessment and provides opportunity for reflective-knowledge building. We also integrated the ability to write paper versions of the examinations to simulate the FRCPC examination, while still maintaining the aforementioned features.

Results/Conclusions: The examination system is currently being piloted by the University of Calgary CCFP-EM program. It is set to be released to the public by March 2019. We will be collecting data through surveys of active users on the utility of integrated features, level of exam preparedness, effectiveness compared to other resources and suggestions for improvement. We will use this information to further develop the examination system..

Joline Bohne - POSTER

Bohne J, Fedwick J.

Quality Improvement Project to Improve Management of Esophageal Food Impaction at South Health Campus

Introduction: Esophageal food bolus (FI) impaction is a gastrointestinal emergency often requiring urgent investigation and treatment. Previous studies have shown that endoscopic intervention is required in 10 to 20 percent of patients to prevent complications of FI including perforation, obstruction, aortoesophageal fistula formation, and tracheoesophageal fistula formation. The risk of complication increases with time and current guidelines suggest that all esophageal foreign bodies be removed within 24 hours and more emergent endoscopy (ideally within two hours, latest six hours) is indicated when symptoms such as inability to handle oral secretions suggest complete esophageal obstruction. The current study will examine the impact of an expedited consult for endoscopy from triage on improving time to definitive care of patients presenting with FI to the Calgary South Health Campus (SHC) Emergency Department.

Methods: A chart review of patients who presented with FI at SHC between September 2017 to January 2018 was conducted. Evaluation of the average time with standard deviation for different components of the patient's visit was calculated: triage to ED MD assessment, ED MD assessment to GI consult, GI consult to scope. Future study will examine these same measurements after initiating an expedited GI referral process.

Results: A total of 20 patients presented with FI during this time. Half of the patients presented after 18:00 requiring activation of the on-call endoscopy team and 65% of patients had ongoing food bolus obstruction at the time of endoscopy which required intervention. The average time from ED presentation to scope was 227 minutes with a standard deviation of 168 minutes, the average time spent in the emergency department from presentation to GI consult was 98 minutes with a standard deviation of 54 minutes.

Conclusion: The project is still in progress yet it is hypothesized that patients who are appropriately triaged and consulted directly to GI would result in a decreased time of FI to endoscopic treatment thus reducing the risk of morbidity and mortality.

Connor O'Rielly - POSTER

O'Rielly C, Sutherland L, Wong C.

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

Introduction: Patients with chronic non-cancer pain (CNCP) and opioid-use disorders make up a category of patients who present unique challenges to emergency department (ED) care providers and healthcare administrators. Their conditions predispose them to frequent ED utilization and high rates of low yield diagnostic testing. This problem has been compounded by the worsening opioid epidemic that has rendered clinicians apprehensive about how they approach pain in this population. 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 intervention 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 successfully 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..

Bretton Hari - POSTER

Hari B, Johnston A.

Using Banff as a model to develop simulation programs in rural and regional settings: a descriptive study

Introduction: Comprehensive high fidelity simulation medicine training programs designed for healthcare providers are a valuable resource for developing, acquiring, and maintaining important knowledge and skills. Developing such a program, however, can be a daunting task for a rural or regional site without access to the resources of an academic institution. Additionally, there is a paucity of literature providing methodology for the most economical and effective way to build such a program. With this descriptive study, our team hopes to translate the methodology used to create the successful high fidelity simulation program at Mineral Springs Hospital in Banff, Alberta for the development of similar programs in other rural or regional settings.

Methods: A comprehensive literature review to identify similar descriptive studies to ours was first performed using key terms such as 'simulation training', 'rural', 'regional', 'remote', 'emergency medicine', and 'nurses'. Interviews with the healthcare providers involved in the development of the Banff simulation program were held, and on-site visits occurred at Mineral Springs hospital to photograph and catalogue the equipment and set-up. Interview scripts are currently in the process of being parsed into multiple categories of necessary components in the development of a rural simulation program. These categories will then be used to create a text and graphical representation of methodology required to develop such a program.

Results: Our comprehensive literature review of four databases resulted in no identifiable literature with similar aims as our descriptive study, thus highlighting the utility for research in this area. Early parsing of interviews and resource cataloging has resulted in six preliminary categories: human resources, space, materials, curriculum, training, and finances. Description of methods utilized by the Banff simulation team to address each category will be further delineated.

Conclusion: There is a need for literature focused on the development of medical simulation programs in rural and regional settings. Our descriptive study has shown that Banff, AB developed their program by addressing six key categories, which can be emulated by new centers hoping to develop a robust program of their own.

Holly Feist - POSTER

Feist H, Mahoney M, Mikrogianakis A.

Stepping Up: Introduction of a RRS to the ED.

Introduction: Imbalance of demand and supply for inpatient beds is just one reason that emergency departments (ED) face congestion (Shah, Punjani, Megahni, and Bhanji, 2014). The result of this imbalance often results in admitted patients waiting hours to days within the ED for an appropriate space in the hospital. Furthermore, this wait can actually result in an inequity of available resources to these patients. In order to bridge this gap of inequity, a pilot project was conducted at the Alberta Children's Hospital (ACH) in Calgary, AB, Canada.

Methods: From December 2016 to March 2017 a pilot project was completed at ACH to see if the introduction of health care professional (HCP) advocated rapid response system (RRS - known as the STEP team at ACH) activation from the ED could narrow the gap patients face regarding access to critical care resources. Antecedents to this pilot included a quality assurance review (OAR), ED to Inpatient to PICU within 24-hour admission rates, as well as anecdotal information from nurses and hospital pediatric physicians that this pilot was necessary. Results: The introduction of nurse or physician activated RRS from the ED did not result in a prolonged patient stay within the ED. 76% activations saw patients continue on their stay trajectory of solely an inpatient visit with the remaining 24% requiring an unscheduled PICU admission. Of the patients who came to the PICU from the ED post RRS activation, 64% did not have a PICU consult at any time prior to the RRS activation. Around half (54%) of the patients who had a RRS activation in the ED yet still went to the inpatient unit were admitted to the PICU in less than 24 hours. ED nurses made the majority of RRS activations.

Conclusions: HCP activating a RRS team, while the patient remains in the ED, ensures acutely ill children who become critical ill have the same access to critical care resources as those offered to patients who already reside within inpatient units. Further study is needed to understand why so many patients did not have a PICU consults prior to the RRs activation as well as further study and pilot projects to understand how RRS activations can be used within the ED.

Josh Melegrito – POSTER + PECHAKUCHA PRESENTATION

Melegrito J, Granberg B, Hanrahan K.

Implementation of a novel physician fan-out mechanism for mass casualty incidents in an urban centre

Introduction: 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.

Methods: 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.

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.

Conclusion: 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..

Brendan Kelliher - POSTER + PECHAKUCHA PRESENTATION

Kelliher B, Wang D, Lang E.

Mental Health Consultations for Emergency Department Patients in Crisis: Insights into quality improvement opportunities from a multicenter analysis

Introduction: Mental health and addiction presentations are on the increase in Canadian 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 inpatinet 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 inpatinet 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.

Dirk Chisholm - POSTER + PECHAKUCHA PRESENTATION

Chisholm D, Wang D, Rich T, Grabove M, Sherlock K, Lang E.

This patient is "OK for Chairs": A multimodal evaluation of an emergency department (ED) electronic tracking board utility designed to improve throughput by optimizing stretcher utilization.

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. ED 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. As part of a thematic analysis, 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.

Catherine Patocka - POSTER + PECHAKUCHA PRESENTATION

Patocka C, Cheng A, Sibbald M, Duff J, Lee-Nobbee P, Levin H, Varshney T, Weber B, Abedin T, Bhanji F

What is the effect of a spaced instructional design on pediatric resuscitation self-efficacy?

Introduction: Resuscitation performance directly impacts patient survival therefore, healthcare providers (HCP) are routinely taught these critical skills in a formal course at a significant cost to the healthcare system. HCPs completing resuscitation courses routinely show a significant decay of skills in the weeks to months following training, often before they would be called upon to use them in a clinical setting. The purpose of this study was to determine if a pediatric resuscitation course taught to experienced Emergency Medical Services providers (EMS) in a spaced format compared to the usual massed instruction results in improved retention of learner performance in a simulated pediatric resuscitation scenario.

Methods: We delivered a Pediatric Advanced Life Support (PALS) course to EMS providers in either a spaced (four 3.5-hour weekly sessions) or a massed format which reflects conventional resuscitation course delivery (two 7-hour sessions over 2 consecutive days). Before and 12-weeks following course completion, participants completed a simulated pediatric resuscitation scenario in teams of 2 providers. Blinded observers used the clinical performance tool (CPT), a resuscitation scenario assessment tool with prior published evidence of validity, to evaluate video recordings of participant performance (primary outcome). Time to cardiopulmonary resuscitation (CPR) and chest compression fraction (% time during which chest compressions were done) were also recorded as secondary outcomes.

Results: Sixteen out of 22 teams (7 spaced and 9 massed) of providers completed the baseline and post-12 weeks resuscitation scenarios. There was no significant difference between the spaced and massed groups on the baseline CPT score (40 ±4.6 versus 35 ±4.1, p=0.51). Teams in the spaced group performed significantly better (57 ±4.3 versus 40 ±3.8, p=0.0001) on the 12-weeks post-course assessment. There was no difference between time to CPR at baseline (59 ±15s versus 66 ±13s, p=0.96) or at the 12-week post-course assessment (32 ±5.2s versus 23 ±4.6s, p=0.18) and chest compression fraction baseline (76 ± 4.7% versus 70 ±4.1%, p=0.36) 12-weeks post-course(87± 3.8% versus 81 ±3.3%, p=0.45).

Conclusion: Long-term retention of pediatric resuscitation performance may be better three-months post-training when it is learned in a spaced format compared to traditional massed training.

Miles Hunter - POSTER + PECHAKUCHA PRESENTATION

Hunter M, Patocka C.

What's your type? Personality types among emergency medicine physicians

Introduction: Emergency physicians work with critically ill patients in a time sensitive environment that strains interpersonal skills, communication and decision-making. Administering self-assessment through Insights Discovery, a registered and validated personality assessment tool, can help us epidemiologically understand the personality characteristics of emergency physicians and how they may vary within subgroups of the emergency physician team. Existing literature on the use of personality assessment tools for emergency physicians is limited. To date, a multi-centre emergency department zone including staff and residents has not been studied in North America using a simple, validated personality tool such as Insights Discovery. Our research question asks: what are the personality profiles, as determined by the Insights Discovery Questionnaire, of emergency medicine residents and attending staff in the AHS Calgary zone emergency departments?

Methods: A cross-sectional survey will be conducted via online administration of the Insights Discovery questionnaire to all 188 emergency physicians and 29 residents of the AHS Calgary Zone emergency department, projected for Fall 2019. The Insights Discovery questionnaire provides four possible personality colours: cool blue, fiery red, sunshine yellow and earth green, one of which will be the primary personality colour for each participant. The primary outcome is the proportion of each primary personality colour among emergency physicians. Secondary outcomes include subgroup distribution of colours for: (1) male vs female physicians, (2) FRCPC vs CCFP-EM trained, (3) resident vs staff, (4) age above vs below median and (5) leadership position vs non-leadership position.

Results: Yet to be obtained; primary outcome results will include the proportion of each of the four Insights Discovery colours with their respective 95% confidence intervals. Secondary outcome subgroups will be compared using Chi-squared test for categorical data. A p value of 0.05 will be set to determine statistically significant differences.

Conclusion: Emergency departments in the Calgary zone carry a large and diverse group of physicians. A better understanding of the team can improve physician self-assessment and act as a stepping stone toward enhanced departmental collaboration and team development. Overall, this study can be the first of its kind in North America, shedding light on the personality characteristics of physicians within the unique emergency department environment.

Adam Oster – PECHAKUCHA PRESENTATION

Oster A, Krook C, Kully K, Samoil K.

Adverse Events During Cardiac Arrest Care

Introduction: Cardiac arrest care is delivered by teams of highly trained personnel working both independently and co-dependently to carry out specialized tasks. This care occurs in a limited physical space and in a compressed time frame. With the physical space around a patient limited, at times concurrent procedural and diagnostic activities create a conflict between personnel for this space. Personnel placement, equipment location and overall resuscitation room setup largely occur ad hoc and this lack of design may contribute to this conflict. The optimal positioning of both personnel and the equipment necessary for safe and efficient task completion has not been examined in the Resuscitation literature. Novel positioning of personnel and equipment could reduce congestion events, contribute to improved CPR delivery and potentially improve the care delivered during cardiac arrest. This study received REB approval.

Methods: The study digitally captured the initial 10 minutes of 20 consecutive CPR in-progress non-traumatic cardiac arrests using a permanently mounted camera in a Trauma Bay of the Foothills Medical Center Emergency Department. Digital footage was then reviewed independently by 2 reviewers for pre-defined instances of congestion between personnel and/or congestion between equipment. Pre-defined instances of significant CPR interruption and sub-optimal CPR were also identified.

Results: Instances of congestion between personnel and personnel (P-P), personnel and equipment (P-E) as well as between equipment and equipment (E-E) were identified during each cardiac arrest scenario. The location of these events will be plotted on a Resuscitation Bay schematic and the frequency of congestion events represented. The type and location of congestion events will be presented both per scenario and in aggregate including all the reviewed scenarios. Instances of CPR interruption =I> 3 seconds and the patient stretcher location of the interruption (EMS vs ED stretcher) identified. Instances of one-handed CPR and the patient stretcher location was identified.

Conclusion: During the provision of care during cardiac arrest management identification of the sub-type and frequency of congestion events among personnel and equipment will provide an opportunity to develop novel re-positioning of personnel and equipment. Identifying the location and incidence of CPR interruptions as well as one-handed CPR will provide an opportunity to devise novel methods to deliver optimal and uninterrupted CPR.

Stephanie VandenBerg – PECHAKUCHA PRESENTATION

VandenBerg SD, Harvey G, Martel J, Gill S, McLaren J

Community Based Naloxone Usability Testing

Introduction: 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.

Methods: This study measures 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.

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.

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.

Conclusion: 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.

Daniel Grigat (Presented by Jayna Holroyd-Leduc) – PECHAKUCHA PRESENTATION

Grigat D, Andruchow J, Lang E, Hair H, Holroyd-Leduc J.

Improving Acute Care for Long-Term Care Residents

Introduction: Within the Calgary Zone there are 43 Long Term Care facilities (LTC) housing nearly 8,000 residents. In 2017/18, these residents accounted for 3,518 transfers to a Calgary Emergency Department (ED), 45,233 hours of ED bed time, and 1,819 hospital admissions. A significant portion of these transfers might have been more appropriately managed within the resident's care home. These potentially avoidable transfers include 16.4% of visits classified as CTAS 4 or 5, as well as higher acuity patients near end of life who could be managed within their LTC facility with appropriate supports. Transfer to the ED is associated with exposure to iatrogenic harms including infections, falls, delirium, and functional decline, as well as consuming significant EMS and ED resources. When ED visits are appropriate, poor communication between the ED and transferring facility can lead to a poor understanding of baseline functional and cognitive abilities, suboptimal problem delineation and management, inefficient resource utilization, patient and family dissatisfaction, and poor patient outcomes.

Methods: A partnership between Emergency Medicine, Seniors Health, Mobile Integrated Healthcare (MIH), and RAAPID is launching an intervention to improve acute care for long term care residents. We will implement a centralized and standardized LTC-ED care and referral pathway through RAAPID for LTC facilities seeking transfer to ED. RAAPID enables 24/7 consultation between physicians regarding patients with urgent healthcare needs and coordinates flow into and out of AHS facilities. Assisted by evidence-based tools, and informed by the LTC residents Goals of Care Designation, RAAPID will facilitate a consultation between an ED physician and the resident's LTC physician to identify cases suitable to be treated by Mobile Integrated Healthcare (Community Paramedicine) within the resident's care home. When transfer is deemed necessary, RAAPID will mediate the completion of a standardized transfer check list capturing data such as baseline function and cognitive status, reason for transfer, expectations around the transfer, investigations completed, and ongoing management plans in an effort to decrease errors that can occur in care transitions and to improve continuity of care.

Results: Our objectives is to implement and evaluate an evidence-informed standardized care process for the care of LTC residents experiencing an acute change in health status. A quasi-experimental randomized stepped-wedge design will allow for sequential implementation within LTC facilities, while supporting scientific rigour of the evaluation. The evaluation framework will use a mixed-methods approach, where quantitative and qualitative data collection will occur concurrently. The primary outcome will be the change in the rate of transfers to ED from LTC facilities per 1000 resident days. Secondary outcomes will include the proportion of LTC residents cared for by MIH deployments, the self-reported experience of residents and their family members, and the appropriateness of care as determined by a physician adjudication panel.

Conclusion: There is a significant opportunity to improve the appropriateness of care provided to LTC residents, to reduce avoidable transfers to emergency, and to improve the management of limited health system resources. Pursuing this opportunity requires taking a patient-centered approach that spans the care continuum and involves a broad partnership of stakeholders.