from the drone and initiated resuscitative efforts on a manikin. The second phase (2 scenarios) were done in a similar manner save for the drone being dispatched from a regionally optimized location for drone response. **Results:** Phase 1: The distance from dispatch location to scene varied from 6.6 km to 8.8 km. Mean (SD) response time from 911 call to scene arrival was 11.2 (+/- 1.0) minutes for EMS compared to 8.1 (+/- 0.1) for AED drone delivery. In all four simulations, the AED drone arrived before EMS, ranging from 2.1 to 4.4 minutes faster. The mean time for trained responders to retrieve the AED and apply it to the manikin was 35 (+/- 5) sec. No difficulties were encountered in drone activation by dispatch, drone lift off, landing or removal of the AED from the drone by responders. Phase 2: The ambulance response distance was 20km compared to 9km for the drone. Drones were faster to arrival at the scene by 7 minutes and 8 minutes with AED application 6 and 7 minutes prior to ambulance respectively. **Conclusion:** This implementation study suggests AED drone delivery is feasible with improvements in response time during a simulated SCA scenario. These results suggest the potential for AED drone delivery to decrease time to first defibrillation in rural and remote communities. Further research is required to determine the appropriate distance for drone delivery of an AED in an integrated EMS system as well as optimal strategies to simplify bystander application of a drone delivered AED.

Keywords: defibrillation, emergency medical services, out-of-hospital cardiac arrest

LO20

The characteristics, clinical course and disposition of long-term care patients treated by paramedics during an emergency call: Exploring the potential impact of community paramedicine

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Introduction: An increasing number of Canadian paramedic services are creating Community Paramedic programs targeting treatment of long-term care (LTC) patients on-site. We explored the characteristics, clinical course and disposition of LTC patients cared for by paramedics during an emergency call, and the possible impact of Community Paramedic programs. **Methods:** We completed a health records review of paramedic call reports and emergency department (ED) records between April 1, 2016 and March 31, 2017. We utilized paramedic dispatch data to identify emergency calls originating from LTC centers resulting in transport to one of the two EDs of the Ottawa Hospital. We excluded patients with absent vital signs, a Canadian Triage and Acuity Scale (CTAS) score of 1, and whose transfer to hospital were deferrable or scheduled. We stratified remaining cases by month and selected cases using a random number generator to meet our apriori sample size. We collected data using a piloted standardized form. We used descriptive statistics and categorized patients into groups based on the ED care received and if the treatment received fit into current paramedic medical directives. **Results:** Characteristics of the 381 included patients were mean age 82.5 years, 58.5% female, 59.7% hypertension, 52.6% dementia and 52.1% cardiovascular disease. On arrival at hospital, 57.7% of patients waited in offload delay for a median time of 45 minutes (IQR 33.5-78.0). We could identify 4 groups: 1) Patients requiring no treatment or diagnostics in the ED (7.9%); 2) Patients receiving ED treatment within current paramedic medical directives and no diagnostics (3.2%); 3) Patients requiring diagnostics or ED care outside current paramedic directives (54.9%); and 4) patients requiring admission (34.1%). Most patients were discharged from the ED (65.6%), and 1.1% died. The main ED diagnoses were infection (18.6%) and musculoskeletal injury (17.9%). Of the patients that required ED care but were discharged, 64.1% required x-rays, 42.1% CT, and 3.4% ultrasound. ED care included intravenous fluids (35.7%), medication (67.5%), antibiotics (29.4%), non-opioid analgesics (29.4%) and opioids (20.7%). Overall, 11.1% of patients didn't need management beyond current paramedic capabilities. **Conclusion:** Many LTC patients could receive care by paramedics on-site within current medical directives and avoid a transfer to the ED. This group could potentially grow using Community Paramedics with an expanded scope of practice.

Keywords: community paramedic, long-term care, reducing emergency department visits

LO21

Consistency of CTAS scores by presenting complaint pre and post eCTAS implementation in 35 emergency departments across Ontario

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Introduction: eCTAS is a real time electronic triage decision-support tool designed to improve patient safety and quality of care by standardizing the application of the Canadian Triage and Acuity Scale (CTAS). The tool dynamically calculates a recommended CTAS score based on the presenting complaint, vital signs and selected clinical modifiers. The primary objective was to assess consistency of CTAS score distributions across 35 emergency departments (EDs) by 16 presenting complaints pre and post eCTAS implementation. **Methods:** This retrospective cohort study used population-based administrative data from January 2016 to December 2018 from all hospital EDs in Ontario that had implemented eCTAS with at least 9 months of data. Following a 3-month stabilization period, we compared data for 6 months post-eCTAS implementation to the same 6-month period the previous year (pre-implementation) to account for potential seasonal variation, patient volume and case-mix. We included triage encounters of adult (≥18 years) patients if they had one of 16 pre-specified high-volume, presenting complaints. A paired-samples t-test was used to determine consistency by estimating the absolute difference in CTAS distribution for each presenting complaint, by each hospital, pre and post eCTAS implementation, compared to the overall average of the 35 EDs. **Results:** There were 183,231 triage encounters in the pre-eCTAS cohort and 179,983 in the post-eCTAS cohort from 35 EDs across the province. Triage scores were more consistent with the overall average after eCTAS implementation in 6 (37.5%) presenting complaints: chest pain (cardiac features) ($p < 0.001$), extremity weakness/symptoms of cerebrovascular accident ($p < 0.001$), fever ($p < 0.001$), shortness of breath ($p < 0.001$), syncope ($p = 0.02$), and hyperglycemia ($p = 0.03$). Triage consistency was similar pre and post eCTAS implementation for the presenting complaints of altered level of consciousness, anxiety/situational crisis, confusion, depression/suicidal/deliberate self-harm, general weakness, head injury, palpitations, seizure, substance misuse/intoxication or vertigo. **Conclusion:** A standardized, electronic

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approach to performing triage assessments increased consistency in CTAS scores across many, but not all, high-volume CEDIS complaints. This does not reflect triage accuracy, as there are no known benchmarks for triage accuracy. Improvements in consistency were greatest for sentinel presenting complaints with a minimum allowable CTAS score.

Keywords: consistency, electronic Canadian Triage and Acuity Scale, triage

LO22

Risk-stratification of emergency department syncope by artificial intelligence using machine learning: human, statistics or machine

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Introduction: The Canadian Syncope Risk Score (CSRS) is a validated risk tool developed using the best practices of conventional biostatistics, for predicting 30-day serious adverse events (SAE) after an Emergency Department (ED) visit for syncope. We sought to improve on the prediction ability of the CSRS and compared it to physician judgement using artificial intelligence (AI) research with modern machine learning (ML) methods. **Methods:** We used the prospective multicenter cohort data collected for the CSRS derivation and validation at 11 EDs across Canada over an 8-year period. The same 43 candidate variables considered for CSRS development were used to train and validate the four classes of ML models to predict 30-day SAE (death, arrhythmias, MI, structural heart disease, pulmonary embolism, hemorrhage) after ED disposition. Physician judgement was modeled using the two variables, referral for consultation and hospitalization. We compared the area under the curve (AUC) for the three models. **Results:** The proportion of patients who suffered 30-day SAE in the derivation cohort (N = 4030) was 3.6% and in validation phase (N = 2290) was 3.4%. Characteristics of the both cohorts were similar with no shift. The best performing ML model, a gradient boosting tree-based model used all 43 variables as predictors as opposed to the 9 final CSRS predictors. The AUC for the three models on the validation data were: best ML model 0.91 (95% CI 0.87–0.93), CSRS 0.87 (95% CI 0.83–0.90) and physician judgment 0.79 (95% CI 0.74 - 0.84). The most important predictors in the ML model were the same as the CSRS predictors. **Conclusion:** A ML model developed using AI method for risk-stratification of ED syncope performed with slightly better discrimination ability though not significantly different when compared to the CSRS. Both the ML model and the CSRS were better predictors of poor outcomes after syncope than physician judgement. ML models can perform with similar discrimination abilities when compared to traditional statistical models and outperform physician judgement given their ability to use all candidate variables.

Keywords: artificial intelligence, risk-stratification, syncope

LO23

Do point of care ultrasound findings of left ventricular dysfunction predict cardiogenic shock in undifferentiated hypotensive patients?

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Introduction: Patients presenting to the emergency department (ED) with hypotension have a high mortality rate and require careful yet rapid resuscitation. The use of cardiac point of care ultrasound (PoCUS) in the ED has progressed beyond the basic indications of detecting pericardial fluid and activity in cardiac arrest. We examine if finding left ventricular dysfunction (LVD) on emergency physician performed PoCUS reliably predicts the presence of cardiogenic shock in hypotensive ED patients. **Methods:** We prospectively collected PoCUS findings performed in 135 ED patients with undifferentiated hypotension as part of an international study. Patients with clearly identified etiologies for hypotension were excluded, along with other specific presumptive diagnoses. LVD was defined as identification of a generally hypodynamic LV in the setting of shock. PoCUS findings were collected using a standardized protocol and data collection form. All scans were performed by PoCUS-trained emergency physicians. Final shock type was defined as cardiogenic or non-cardiogenic by independent specialist blinded chart review. **Results:** All 135 patients had complete follow up. Median age was 56 years, 53% of patients were male. Disease prevalence for cardiogenic shock was 12% and the mortality rate was 24%. The presence of LVD on PoCUS had a sensitivity of 62.50% (95%CI 35.43% to 84.80%), specificity of 94.12% (88.26% to 97.60%), positive-LR 10.62 (4.71 to 23.95), negative-LR 0.40 (0.21 to 0.75) and accuracy of 90.37% (84.10% to 94.77%) for detecting cardiogenic shock. **Conclusion:** Detecting left ventricular dysfunction on PoCUS in the ED may be useful in confirming the underlying shock type as cardiogenic in otherwise undifferentiated hypotensive patients.

Keywords: echocardiography, hypotension, point of care ultrasound

LO24

Implementing emergency department take-home naloxone programs: a systematic scoping review

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Introduction: Distributing take-home naloxone (THN) kits from Emergency Departments (EDs) is an important strategy for preventing opioid overdose deaths. However, there is a lack of clear operational guidance for implementing ED-based THN programs. This scoping review had two objectives: 1) identify key strategies for THN distribution in EDs, and 2) develop a theory-informed implementation model that can be used to optimize the effectiveness of ED-based THN programs. **Methods:** We systematically searched health science databases through April 18, 2019. The search strategy combined terms representing the ED, naloxone, and take-home kits/bystander administration. Two reviewers independently screened the search results. We included all peer-reviewed articles that described THN distribution within EDs. A standardized form was used for data extraction. Included studies were coded by two reviewers and mapped to domains of the Consolidated Framework for Implementation Research (CFIR). A third reviewer with content expertise adjudicated disagreements in record screening and data coding. **Results:** Database searching retrieved 717 records after duplicates were removed. 87 full-text studies were assessed for eligibility. Two studies were added through other sources, resulting in a total of 21 studies included in the final review. Of note, 14 studies evaluated existing ED-based THN programs. We synthesized themes that emerged within each CFIR domain and identified four key implementation strategies: 1) develop ED policies on opioid harm reduction; 2)

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