Introduction / Innovation Concept: Utilization of CT imaging has increased dramatically over the past two decades, but has not necessarily improved patient outcomes. As healthcare spending grows unsustainably and evidence of harms from unnecessary testing accrues, there is pressure to improve imaging appropriateness. However, prior attempts to reduce unnecessary imaging using evidence-based guidelines have met with limited success, with common barriers cited including a lack of confidence in patient outcomes, medicolegal risk, and patient expectations. This project attempts to address these barriers through the development of an electronic clinical decision support (CDS) tool embedded in clinical practice. **Methods:** An interactive web-based point-of-care CDS tool was incorporated into computerized physician order entry software to provide real-time evidence-based guidance to emergency physicians for select clinical indications. For patients with mild traumatic brain injury (MTBI), decision support for the Canadian CT Head Rule pops up when a CT head is ordered. For patients with suspected pulmonary embolism (PE), the tool is triggered when a CT pulmonary angiogram is ordered and provides CDS for the Pulmonary Embolism Rule-out Criteria (PERC), Wells Score, age-adjusted D-dimer and CT imaging. To study the impact of the tool, all emergency physicians in the Calgary zone were randomized to receive voluntary decision support for either MTBI or PE. **Curriculum, Tool, or Material:** The tool uses a multifaceted approach to inform physician decision making, including visualization of risk and quantitative outcomes data and links to primary literature. The CDS tool simultaneously documents guideline compliance in the health record, generates printable patient education materials, and populates a REDCap™ database, enabling the creation of confidential physician report cards on CT utilization, appropriateness and diagnostic yield for both audit and feedback and research purposes. Preliminary data show that physicians are using the MTBI CDS approximately 30% of the time, and the PE CDS approximately 40% of the time. Evaluation of CDS impact on imaging utilization and appropriateness is ongoing. **Conclusion:** A voluntary web-based point-of-care decision support tool embedded in workflow has the potential to address many of the factors typically cited as barriers to use of evidence-based guidelines in practice. However, high rates of adherence to CDS will likely require physician incentives and appropriateness measures.

Keywords: knowledge translation, decision support, diagnostic imaging

LO23

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

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Introduction: 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 simulator. **Methods:** Emergency medicine residents with no prior TEE experience from a university-affiliated hospital 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. Secondary outcomes included confidence level, image quality, percentage of correct diagnoses, and efficiency of movement. Assessment scores were compared using a two-tailed t-test. **Results:** 10 of 11 (91%) of invited residents agreed to participate in the study. Confidence level on a 10-point numeric rating scale (NRS) increased from a baseline of 1.0 (SD 0) to 7.0 (SD 1.9) after training ($p < 0.01$). The mean duration between training and transfer test was 9.6 days (SD 1.9). The percentage of successful views increased from 44% at baseline to 100% after training, and 90% on the transfer test ($p < 0.01$). The mean image quality on a 5-point scale was 2.2 (SD 1.0) at baseline, 3.8 (SD 0.7) after training ($p < 0.01$), and 3.1 (SD 0.6) on the transfer test ($p < 0.01$). The mean number of transducer accelerations were 524 (SD 202) at baseline, 219 (SD 54) after training ($p < 0.01$), and 400 (SD 149) on the transfer test ($p = 0.13$). Participants made the correct diagnosis in 70% of cases on the transfer test. **Conclusion:** After a brief training session using a simulator, emergency medicine residents were able to generate adequate TEE images on a delayed transfer test. Future studies are needed to determine effective strategies for maintaining motion efficiency and imaging quality.

Keywords: ultrasound, education, simulation

LO24

Is prehospital care supported by evidence-based guidelines? An environmental scan and quality appraisal using AGREE II

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Introduction: The Institute of Medicine (IOM) has recommended that high-quality, evidence-based guidelines be developed for emergency medical services (EMS). The National Association of EMS Physicians (NAEMSP) has outlined a strategy that will see this task fulfilled, consisting of multiple working groups focused on all aspects of guideline development and implementation. A first step, and our objective, was a cataloguing and appraisal of the current guidelines targeting EMS providers. **Methods:** A systematic search of the literature was conducted in MEDLINE (1175), EMBASE (519), PubMed (14), Trip (416), and guidelines.gov (64) through May 1, 2016. Two independent reviewers screened titles for relevance to prehospital care, and then abstracts for essential guideline features, including a systematic review, a grading system, and an association between level of evidence and strength of recommendation. All disagreements were moderated by a third party. Citations meeting inclusion criteria were appraised with the AGREE II tool, which looks at six different domains of guideline quality, containing a total of 23 items rated from 1 to 7. Each guideline was appraised by three separate reviewers, and composite scores were calculated by averaging the scaled domain totals. **Results:** After primary (kappa 97%) and secondary (kappa 93%) screening, 49 guidelines were retained for full review. Only three guidelines obtained a score of >90%, the topics of which included aeromedical transport, analgesia in trauma, and resuscitation of avalanche victims. Only two guidelines scored between 80% and 90%, the topics of which included stroke and pediatric seizure management. One guideline, splinting in an austere environment, scored between 70% and 80%. Nine guidelines scored between 60% and 70%, the topics of which included ischemic stroke, cardiovascular life support, hemorrhage control, intubation, triage, hypothermia, and fibrinolytic use. Of the remaining guidelines, 14 scored between 50% and 60%, and 20 obtained a score of <50%. **Conclusion:** There are few high-quality, evidence-based guidelines in EMS. Of those that are published, the majority fail to meet established

quality measures. Although a lack of randomized controlled trials (RCTs) conducted in the prehospital field continues to limit guideline development, suboptimal methodology is also commonplace within the existing literature.
Keywords: emergency medical services, prehospital care, guidelines

LO25

How safe are our pediatric emergency departments? A multicentre, prospective cohort study

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Introduction: Data regarding adverse events (AEs) (unintended harm to the patient from health care provided) among children seen in the emergency department (ED) are scarce despite the high risk setting and population. The objective of our study was to estimate the risk and type of AEs, and their preventability and severity, among children treated in pediatric EDs. **Methods:** Our prospective cohort study enrolled children <18 years of age presenting for care during 21 randomized 8 hr-shifts at 9 pediatric EDs from Nov 2014 to October 2015. Exclusion criteria included unavailability for follow-up or insurmountable language barrier. RAs collected demographic, medical history, ED course, and systems level data. At day 7, 14, and 21 a RA administered a structured telephone interview to all patients to identify flagged outcomes (e.g. repeat ED visits, worsening/new symptoms, etc). A validated trigger tool was used to screen admitted patients' health records. For any patients with a flagged outcome or trigger, 3 ED physicians independently determined if an AE occurred. Primary outcome was the proportion of patients with an AE related to ED care within 3 weeks of their ED visit. **Results:** We enrolled 6377 (72.0%) of 8855 eligible patients; 545 (8.5%) were lost to follow-up. Median age was 4.4 years (range 3 months to 17.9 yrs). Eight hundred and seventy seven (13.8%) were triaged as CTAS 1 or 2, 2638 (41.4%) as CTAS 3, and 2839 (44.7%) as CTAS 4 or 5. Top entrance complaints were fever (11.2%) and cough (8.8%). Flagged outcomes/triggers were identified for 2047 (32.1%) patients. While 252 (4.0%) patients suffered at least one AE within 3 weeks of ED visit, 163 (2.6%) suffered an AE related to ED care. In total, patients suffered 286 AEs, most (67.9%) being preventable. The most common AE types were management issues (32.5%) and procedural complications (21.9%). The need for a medical intervention (33.9%) and another ED visit (33.9%) were the most frequent clinical consequences. In univariate analysis, older age, chronic conditions, hospital admission, initial location in high acuity area of the ED, having >1 ED MD or a consultant involved in care, (all $p < 0.001$) and longer length of stay ($p < 0.01$) were associated with AEs. **Conclusion:** While our multicentre study found a lower risk of AEs among pediatric ED patients than reported among pediatric inpatients and adult ED patients, a high proportion of these AEs were preventable.
Keywords: pediatrics, patient safety, adverse events

LO26

The efficacy of high dose cephalexin in the outpatient management of moderate cellulitis for pediatric patients

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Introduction: Children with moderate cellulitis are often treated with IV antibiotics in the hospital setting, as per recommendations. Previously in our hospital, a protocol using daily IV ceftriaxone with follow-up at the day treatment center (DTC) was used to avoid admission. In 2013, a new protocol was implanted and suggested the use of high dose (HD) oral cephalexin with follow-up at the DTC for those patients. The aim of this study was to evaluate the safety and efficacy of the HD cephalexin protocol to treat moderate cellulitis in children as outpatient. **Methods:** A retrospective chart review was conducted. Children were included if they presented to the ED between January 2014 and 2016 and were diagnosed with a moderate cellulitis sufficiently severe to request a follow up at DTC and who were treated according to the standard of care with the HD oral cephalexin (100 mg/kg/day) protocol. Descriptive statistics for clinical characteristics of patients upon presentation, as well as for treatment characteristics in the ED and DTC were analyzed. Treatment failure was defined as: need for admission at the time of DTC evaluation, change for IV treatment in DTC or return visit to the ED. Outcomes were compared to historic controls treated with IV ceftriaxone at the DTC, where admission was avoided in 80% of cases. **Results:** During the study period, 682 children with cellulitis were diagnosed in our ED. Of these, 117 patients were treated using the oral HD cephalexin outpatient protocol. Success rate was 89.5% (102/114); 3 patients had an alternative diagnosis at DTC. Treatment failure was reported in 12 cases; 10 patients (8.8%) required admission, one (0.9%) received IV antibiotics at DTC, and one (0.9%) had a return visit to the ED without admission or change to the treatment. This compares favorably with the previous study using IV ceftriaxone (success rate of 80%). No severe deep infections were reported or missed; 4 patients required drainage. The mean number of visits per patient required at the DTC was 1.6. **Conclusion:** Treatment of moderate cellulitis requiring a follow-up in a DTC, using an oral outpatient protocol with HD cephalexin is a secure and effective option. By reducing hospitalization rate and avoiding the need for painful IV insertion, HD cephalexin is a favourable option in the management of moderate cellulitis for pediatric patients, when no criteria of toxicity are present.
Keywords: cellulitis, ambulatory care, children

LO27

System outcomes associated with an emergency department clinical decision unit

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Introduction: A clinical decision unit (CDU) is an area within the emergency department (ED) that allows for protocol-driven treatment & observation of patients who may not require hospital admission, but are not ready for discharge after initial assessment & treatment. A CDU was established at BC Children's Hospital in 2014 as a means to optimize hospital resource utilization. Preliminary administrative data review revealed a return to ED (RTED) rate of 15% following a CDU stay, 2-3 times the RTED rate reported in the literature. Whether this is the expected cost of reducing hospital admissions remains unclear. Research exploring the underlying reasons for RTED following a CDU stay is limited. Objectives: Following a CDU stay, to describe 1) disposition outcome distribution; 2) underlying reasons for RTED; and 3) the proportion of potentially preventable RTED. **Methods:** Retrospective cohort study of all ED visits with a CDU stay from Jan 1, 2015 to Dec 31, 2015. Health records data was extracted & entered into standardized online forms by trained research assistants, then blindly reviewed by two investigators to determine a) the most probable cause