use in situ simulation (18%) and hold a simulation boot camp (41%). Most centres required an academic project, most commonly a quality assurance project (53%) and/or a critical appraisal of the literature (59%). Publication or national conference presentations were required by 12% of programs. Competency based assessments use simulation (88%) and direct observations (53%). Only 24% of programs have a transition to practice curriculum. All programs maintain strong connections to family medicine. **Conclusion:** This study demonstrates diverse structures of CCFP(EM) programs across Canada. Programs are similar regarding the provision of ultrasound, simulation and protected teaching time. Variation exists in administrative structure and financial resources of each program, academic project requirements, and how programs perform competency based assessments.

Keywords: emergency medicine program, certification in the College of Family Physicians – emergency medicine, survey

LO41

Competency-based learning of pediatric musculoskeletal radiographs

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Introduction: Pediatric musculoskeletal (MSK) image interpretation has been identified as a knowledge gap among emergency medicine trainees. The main objective of this study was to implement a validated on-line pediatric MSK radiograph interpretation system with a performance-based competency endpoint into pediatric emergency fellowship programs and examine the number of cases needed to achieve a competency threshold of 80% accuracy, sensitivity and specificity. We further determined proportion who successfully achieved competency in a given module and the change in accuracy from baseline to competency. **Methods:** This was a prospective cohort multi-centre study. There were seven MSK radiograph modules, each containing 200-400 cases (demo-https://imagesim.com/course-information/demo/). Thirty-seven pediatric emergency medicine fellows participated for 12 months. Participants did cases until they reached competency, defined as at least 80% accuracy, sensitivity and specificity. We calculated the overall and per module median number of cases required to achieve competency, proportion of participants who achieved competency, median time on case, and the mean change in accuracy from baseline to competency. **Results:** Overall, the median number of cases required to achieve competency was 76 (min 54, max 756). Between different body parts, there was a significant difference in the median number of cases needed to achieve competency, $p < 0.0001$, with ankle and knee being among the most challenging modules. Proportions of those who started a module and completed it to competency varied significantly, and ranged from 32.4% in the ankle module to 97.1% in the forearm/hand, $p < 0.0001$. The overall median time on each case was 34.1 (min 7.6, max 89.5) seconds. The overall change in accuracy from baseline to 80% competency was 13.5% (95% CI 12.1, 14.8), with the respective Cohens effect size of 1.98. The change in accuracy was different between modules, $p = 0.001$, with post-hoc analyses demonstrating that the ankle/foot radiograph module had a greater increase in accuracy relative to elbow ($p = 0.009$) and pelvis/femur ($p = 0.006$). **Conclusion:** It was feasible for pediatric emergency medicine fellows to complete each learning pediatric MSK learning module to competency within approximately one hour, with the exception of the ankle module. Learners who completed the modules to competency demonstrated very significant increases in interpretation skill.

Keywords: pediatrics, competency, education

LO42

How I stay healthy in emergency medicine: a qualitative analysis of a blog-based survey of expert emergency physicians and their methods to maintain and improve their wellness

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Introduction: Emergency medicine (EM) is a demanding specialty with high rates of physician burnout. As emergency physicians, we must stay healthy to promote healthy living, optimize our ability to care for our patients, extend our careers, and be there for our families. While we all desire a healthy lifestyle, maintaining one in practice can be difficult. We sought to investigate the strategies emergency physician employ to maintain and improve health and wellness while mitigating the professions stressors. **Methods:** From April 2015 to July 2017, forty-three wellness champions from Canada, the USA, and Australia were identified using a snowball sampling technique. Each participant answered 5 introductory questions and 8 productivity questions pertaining to health and wellness. These were transcribed and loaded to a publicly accessible blog, ALiEM.com, as part of the Healthy in EM series. Two investigators reviewed the transcripts using inductive methods and a grounded theory approach to generate themes and subthemes using coding software, NVivo (Burlington, Massachusetts), until saturation was achieved. Consensus between investigators (JC, ZP) established the master code and audit trail. An external audit by investigators (TC, BT) not involved with the initial analysis was performed to ensure reliability. **Results:** Major themes including diet, sleep, exercise and social activities were coded and further subcategorized along with perspectives, habits, personal philosophies, and career diversity. These themes translated across both professional and personal aspects of participants lives. For example, the pre-shift and post-shift strategies often included some form of regimented activities-of-daily-living that required discipline to adhere to at work and home. **Conclusion:** Our findings show the importance of homeostasis in the professional and personal realm among expert emergency medicine physicians. Among healthy emergency physicians, diet, sleep, and exercise patterns intertwined with perspectives, habits, personal philosophies, and social activities contributed to maintenance of wellness.

Keywords: wellness, burnout, job satisfaction

LO43

Perceptions of airway checklists and the utility of simulation in their implementation emergency medicine practitioner perspectives

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Introduction: Checklists used during intubation have been associated with improved patient safety. Since simulation provides an effective and safe learning environment, it is an ideal modality for training practitioners to effectively employ an airway checklist. However, physician attitudes surrounding the utility of both checklists and simulation may impede the implementation process of airway checklists into clinical practice. This study sought to characterize attitudinal factors that may impact the implementation of airway checklists, including perceptions of checklist utility and simulation training. **Methods:** Emergency medicine (EM) residents and physicians working more than 20 hours/month in an emergency department from two academic centres were invited to participate in a simulated, randomized controlled trial (RCT) featuring three scenarios performed with or without the use of an airway

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checklist. Following participation in the scenarios, participants completed either a 26-item (control group), or 35-item (checklist group) paper-based survey comprised of multiple-choice, Likert-type, rank-list and open-ended questions exploring their perceptions of the airway checklist (checklist group only) and simulation as a learning modality (all participants). **Results:** Fifty-four EM practitioners completed the questionnaire. Most control group participants (n = 24/25, 96.0%) believed an airway checklist would have been helpful (scored 5/7 or greater) for the scenarios. The majority of checklist group participants (n = 29) believed that the checklist was helpful for equipment (27, 93.1%) and patient (26, 89.6%) preparation, and post-intubation care (21, 82.8%), but that the checklist delayed definitive airway management and was not helpful for airway assessment, medication selection, or choosing to perform a surgical airway. This group also believed that using the airway checklist would reduce errors during intubation (27, 93.1%) and that the simulated scenarios were beneficial for adopting the use of the checklist (28, 96.6%). Fifty-three participants (98.1%) believed that simulation is beneficial for continuing medical education and 51 respondents (94.4%) thought that skills learned in this simulation were transferable. **Conclusion:** EM practitioners participating in a simulation-based RCT of an airway checklist had positive attitudes towards both the utility of airway checklists and simulation as a learning modality. Thus, simulation may be an effective process to train practitioners to use airway checklists prior to clinical implementation.
Keywords: checklist, airway, simulation

LO44

Optimizing skill retention in radiograph interpretation: a multicentre randomized control trial

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Introduction: Simulation-based education systems have increased physician skill in radiograph interpretation. However, the degree of skill retention and the factors that influence it are relatively unknown. The main objective of this research was to determine the rate and quantity of skill decay in post-graduate trainee physicians who completed a simulation-based learning intervention of radiograph interpretation. The impact of testing and refresher education on skill decay was also examined. **Methods:** This was a prospective, multicenter, analysis-blinded, four arm randomized control trial conducted from November 2014 to June 2016. Study interventions were administered using an on-line learning and measurement platform. Pediatric and emergency medicine residents in the United States and Canada were eligible for study participation. Participants were randomized to one of four groups. All participants completed an 80-case deliberately practiced learning set of pediatric elbow radiographs followed by an immediate 20-case post-test. Following this, Group 1 had no testing until 12 months; Groups 2, 3, and 4 had testing (20 cases without feedback) every 2 months until 12 months, but Group 3 also had refresher education (20 cases with feedback) at six months while Group 4 had refresher education at two, six, and ten months. The main outcome measure was accuracy at 12 months, adjusted for immediate post-test score, days to completion of 12 month test, and time on case. Based on prior data, we assumed the smallest important difference between groups in learning decay is 10%, a between-participant/within-group standard deviation of 17%, a type I error probability of 5%, a power of 80% and adjusted for three tests with a Bonferroni correction. For the primary analysis of Group 1 versus 2, 3, 4, this resulted in a minimal total sample size of 56, with 14 participants per group. **Results:** We enrolled 106 participants that completed all study interventions. The sample sizes in Groups 1, 2, 3, and 4 were 42, 22, 22, and 20 respectively. Overall, accuracy increased by 11.8% (95% CI 9.8, 13.8) with the 80-case learning set and then decreased by 5.5% (95% CI 2.5, 8.5) at 12 months. The difference in learning decay in Group 1 vs. Groups 2, 3, 4 was -8.1% (95% CI 2.5, 13.5), p = 0.005. For Group 2 vs. Group 3 and 4, it was +0.8% (95% CI -7.2, 7.3), p = 0.8, and between Group 3 vs. Group 4 it was +0.8% (95% CI -7.3, 10.1), p = 0.8. **Conclusion:** Skill decay was significantly reduced by testing with 20 cases every two months. Refresher education had no additional effect to testing on reducing learning decay.
Keywords: retention, radiographs, experience curves

LO45

Incidence of delayed intracranial hemorrhage following a mild traumatic brain injury in patients taking anticoagulants or anti-platelets therapies: systematic review and meta-analysis

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Introduction: Head injury is a common presentation to all emergency departments. Previous research has shown that such injuries may be complicated by delayed intracranial hemorrhage (D-ICH) after the initial scan is negative. Exposure to anticoagulant or anti-platelet medications (ACAP) may be a risk factor for D-ICH. We have conducted a systematic review and meta-analysis to determine the incidence of delayed traumatic intracranial hemorrhage in patients taking anticoagulants, anti-platelets or both. **Methods:** The literature search was conducted in March 2017 with an update in April 2017. Keyword and MeSH terms were used to search OVID Medline, Embase and the Cochrane database as well as grey literature sources. All cohort and experimental studies were eligible for selection. Inclusion criteria included pre-injury exposure to oral anticoagulant and / or anti-platelet medication and a negative initial CT scan of the brain (CT1). The primary outcome was delayed intracranial hemorrhage present on repeat CT scan (CT2) within 48 hours of the presentation. Only patients who were rescanned or observed minimally were included. Clinically significant D-ICH were those that required neurosurgery, caused death or necessitated a change in management strategy, such as admission. **Results:** Fifteen primary studies were ultimately identified, comprising a total of 3801 patients. Of this number, 2111 had a control CT scan. 39 cases of D-ICH were identified, with the incidence of D-ICH calculated to be 1.31% (95% CI [0.56, 2.27]). No more than 12 of these patients had a clinically significant D-ICH representing 0.09% (95% CI [0.00, 0.31]). 10 of them were on warfarin and two on aspirin. There were three deaths recorded and three patients needed neurosurgery. **Conclusion:** The relatively low incidence suggests that repeat CT should not be mandatory for patients without ICH on first CT. This is further supported by the negligibly low rate of clinically significant D-ICH. Evidence-based assessments should be utilised to indicate the appropriate discharge plan, with further research required to guide the balance between clinical observation and repeat CT.
Keywords: traumatic brain injury, anticoagulation, delayed intracranial hemorrhage

LO46

Sex-based differences in concussion symptom reporting and self-reported outcomes in a general adult ED population

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