

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

#### LO59

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

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

**Keywords:** competency, critical skill, retention

#### LO60

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

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

**Keywords:** curriculum assessment, research methodology, residency education

#### LO61

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

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

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

**Keywords:** medical education, patient safety, quality improvement

## LO62

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

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**Introduction:** Intranasal dexmedetomidine (IND) is an emerging agent for procedural distress in children. However, studies to date have been limited by small samples and imprecise estimates of effect size. We sought to summarize the evidence on the effectiveness of IND for procedures associated with distress in children. **Methods:** We performed electronic searches of MEDLINE (1946-2018), EMBASE (1980-2018), Google Scholar (2018), CINAHL (1981-2018), Cochrane Central Register of Controlled Trials (2018), 6 clinical trials registries and conference proceedings (2010-2018). Title searches, data abstraction, and risk of bias assessments were performed in duplicate. We included all published and unpublished, randomized and quasi-randomized trials of IND for procedures in children younger than 19 years of age without language restriction. The methodological quality of studies was evaluated using the Cochrane Collaboration's Risk of Bias tool. The primary outcome was the proportion of participants that were deemed to be adequately sedated for the procedure. **Results:** Of 661 studies, 18 met inclusion criteria. Trials involved 2128 participants, age 1 month - 14 years (836, 39.3% females), who received IND 1 - 4 mcg/kg either by drops (n = 12), atomizer (n = 4), or both (n = 2). 12 trials were eligible for meta-analysis. 13 trials used validated instruments to assess

sedation. All studies except one were associated with low or moderate risk of bias. For painful procedures (IV insertion; laceration repair; dental extraction), the pooled OR (95% CI) for adequate sedation and need for additional analgesia was non-significant [1.19 (0.53, 2.65)] and [2.16 (0.62, 7.49)], respectively (n = 5). For non-painful procedures (diagnostic imaging), the corresponding pooled OR (95% CI) favored IND [3.04 (1.58, 5.82)] and [4.44 (2.11, 9.35)], respectively (n = 7). Time to onset and duration of sedation ranged from 13-31 minutes and 41-91.5 minutes, respectively. For adverse effects, the pooled OR (95% CI) was not significantly different between IND and comparators [0.58 (0.22, 1.55)] and there were no serious adverse events. **Conclusion:** IND at doses 1 to 4 mcg/kg are safe and adequately sedate children undergoing non-painful procedures, although the ease of administration must be weighed against the risk of prolonged sedation. Additional trials with larger sample sizes and greater methodologic rigor are needed for painful emergency department procedures such as laceration repair and IV insertion.

**Keywords:** dexmedetomidine, intranasal, sedation

## LO63

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

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