which 3440 were transferred to the EP (67.4%), 2958 of EP assessed callers (86.0%) had a family doctor, but only one-quarter of such patients could contact their family doctor. Overall, 2301/3440 "red" callers did not attend an ED (67.0%) compared to 2508/4770 in the control period (52.6%), for an absolute reduction of 14.4% (95% CI 12.2 to 16.4%, $p < 0.0001$). In callers for those <17 years old there was a 20.3% (95% CI 16.5 to 24.1%) reduction in ED visits compared to the control group: 771/1520 (50.7%) vs 364/1067 (30.4%). 40% of callers attending an ED (458/1139) were advised to try non-ED follow up by the MD and 108 (9.5%) were admitted, with no difference in 30-day mortality between groups. Age and CTAS distribution were similar between the two groups and the non MD-transferred cohort. Mean caller satisfaction was excellent (4.7/5.0). **Conclusion:** EP supplementation of a RN advice service has the potential to reduce ED visits by almost 15% while providing excellent safety and satisfaction.

Keywords: input mitigation, telemedicine, emergency department crowding

LO17

A comparative evaluation of ED crowding metrics and associations with patient mortality

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Introduction: Over 700 different input, throughput and output metrics have been used to quantify ED crowding. Of these, only ED length-of-stay (ED LOS) has been shown to be associated with mortality. No comparative evaluation of ED crowding metrics has been performed to determine which ones have the strongest association with patient mortality. The objective of this study was to compare the strength of association of common ED input, throughput and output metrics to patient mortality. **Methods:** Administrative data from five years of ED visits (2011-2014) at three urban EDs were linked to develop a database of over 900,000 ED visits with patient demographics, electronic time stamps for care processes, dispositions and outcomes. The data were randomly divided into three partitions of equal size. Here we report the findings from one partition of 253,938 ED visits. The remaining two data partitions will be used to validate these findings. Commonly-used crowding metrics were quantified and aggregated by day or by shift (0800-1600, 1600-2400, 2400-0800), and the shift-specific metrics assigned to each patient. The primary outcome was 7-day all-cause mortality. Multilevel logistic regression models were developed for 7-day mortality, with selected ED crowding metrics and a common set of confounders as predictors. The strength of association between the crowding metrics and mortality was compared using Akaike's Information Criterion (AIC) and the Bayesian Information Criterion (BIC): ED crowding metrics with lower AIC and BIC have stronger associations with 7-day mortality. **Results:** Of 909,000 ED encounters, 124,679 (16.5%) arrived by EMS, 149,233(19.7%) were admitted, and 3,808 patients (0.5%) died within 7 days of ED arrival. Of input metrics, the model with ED wait-time was better (i.e. had a smaller AIC and BIC) than models for daily census, ED occupancy or LWBS proportion for predicting 7-day mortality. Of throughput metrics, the model with mean ED LOS was better than the model for mean MD care time. Of output metrics, the model with daily inpatient hospital occupancy was better than the model with mean boarding time. **Conclusion:** Based on one data partition, regression models based on the average wait-time, ED LOS and inpatient occupancy best predicted 7-day mortality. These results will be validated in the two other data partitions to confirm the best-performing ED input, throughput and output metrics.

Keywords: emergency department crowding, crowding metrics

LO18

How big is emergency access block in Canadian hospitals?

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Introduction: Emergency department (ED) access block is the #1 safety concern in Canadian EDs. Its main cause is *hospital access block*, manifested by prolonged *boarding* of inpatients in EDs. Hospital administrators often believe this problem is too big to be solved and would require large increases in hospital capacity. Our objective was to quantify ED access gap by estimating the cumulative hours that CTAS 1-3 patients are blocked in waiting areas. This value, expressed as a proportion of inpatient care capacity, is an estimate of the bed hours a hospital would have to find in order to resolve ED access. **Methods:** A convenience sample of urban Canadian ED directors were asked to provide data summarizing their CTAS 1-3 inflow, the proportion triaged to nursed stretchers vs. RAZ or Intake areas, and time to care space. Total ED access gap was calculated by multiplying the number of CTAS 1-3 patients by their average delay to care space. Time to stretcher was captured electronically at participating sites, but time to RAZ or intake spaces was often not. In such cases, respondents provided time from triage to first RN or MD assessment in these areas. The primary outcome was total annual ED access block hours for emergent-urgent patients, expressed as a proportion of funded inpatient bed hours. **Results:** Directors of 40 EDs were queried. Six sites did not gather the data elements required. Of 34 remaining, 29 (85.3%) provided data, including 15 tertiary (T), 10 community (C) and 2 pediatric (P) sites in 12 cities. Mean census for the 3 ED types was 72,308 (T), 58,849 C) and 61,050 (P) visits per year. CTAS 1-3 patients accounted for 73.4% (T), 67.7% (C) and 66.2% (P) of visits in the 3 groups, and 34% (T), 46% (C) and 44% (P) of these patients were treated in RAZ or intake areas rather than staffed ED stretchers. Mean time to stretcher/RAZ care was 50/71 min (T), 46/62 min (C), and 37/59 min (P). Average ED access gap was 47,564 hrs (T), 37,222 hrs (C) and 35,407 hrs (P), while average inpatient bed capacity was 599 beds (5,243,486 hrs), 291 beds (2,545,875 hrs) and 150 beds (1,314,000 hrs) respectively. ED access gap as a proportion of inpatient care capacity was 0.93% for tertiary, 1.46% for community and 2.69% for pediatric centres. **Conclusion:** ED access gap is very large in Canadian EDs, but small compared to hospital operating capacity. Hospital capacity or efficiency improvements in the range of 1-3% could profoundly mitigate ED access block.

Keywords: access block, crowding, efficiency

LO19

Introduction of a regional interactive group supervision tool to maximize multi-program research project support

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Introduction / Innovation Concept: University Departments of Emergency Medicine are responsible for the supervision of research and other scholarly projects for fellows, residents and students, though often lack resources to provide adequate input and oversight. Many departments cover large geographical areas and several programs. We piloted new research committee structures and processes to improve oversight and

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output of research projects. **Methods:** We created an interactive group supervision tool based around formation of a collaborative research committee, with rotating chairs from each program, to provide supervision and face to face interaction, and direction for research learners. Included were all Dalhousie University adult and pediatric emergency medicine residency and fellowship programs, as well as trauma and EMS programs across Nova Scotia, New Brunswick, and Prince Edward Island. In addition to providing expertise in clinical trial coordination, database management, research administration, grant applications and Research Ethics Board submissions, we have completed a 2-year pilot of our interactive group supervision tool for research projects. **Curriculum, Tool, or Material:** The interactive tool consists of a structured PICOD form; allocation of topic and research mentors; standardized yearly milestones from project development through presentation and publication; and regular video-conferenced and in-person interactive group sessions involving several project leads, as well as program research directors, researchers, and co-ordinators. To date, all participating program learners have engaged with the tool, with positive feedback from learners, supervisors and program directors. **Conclusion:** We report our development of a regional collaborative interactive group supervision tool, that maximizes expert resources in the provision of research and scholarly project supervision.

Keywords: research supervision, interactive group tool, resource allocation

LO20

Student Run Simulation Team: A near-peer approach to simulation education

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Introduction / Innovation Concept: Student Run Simulation Team (SRST) is an extracurricular medical student group that provided peers with opportunities to learn and teach principles of acute care medicine in a simulated environment. Early exposure to simulation has been identified as a way for medical students to engage in self-directed education. SRST operated through a peer-led model. Senior medical students designed and delivered didactic sessions, simulation scenarios, and debriefed the scenarios to emphasise targeted objectives. **Methods:** Informal interviews conducted by the SRST as part of a needs analysis identified barriers to an effective transition from pre-clerkship to clerkship. Specifically, principles of team dynamics including effective communication and role clarification in emergency situations were identified as areas where students lacked confidence. The curriculum focused on leadership and an effective team approach to common acute presentations. SRST members acquired simulation skills under the guidance of a simulation team at the University of Calgary. In the inaugural year, 8 second year students developed and delivered the curriculum to 16 first year students. Quality improvement surveys and participant feedback contributed to ongoing program review and refinement. **Curriculum, Tool, or Material:** Didactic lectures and task-trainer based skills sessions were created to assist the medical students in developing a foundational approach to a patient presenting to the emergency department. Three distinct simulations of increasing complexity were designed for students to build on their skills. SRST members worked with simulation consultants during 4 custom designed training sessions to develop simulation skills (design and debriefing). The distinguishing aspect of SRST is an emphasis on the non-technical skills of teamwork, leadership, and communication, rather than knowledge acquisition alone. The structure also included a succession plan for continued peer-led education where the student participants will form the next year's team and will receive similar simulation education. **Conclusion:** SRST is the first student-run simulation initiative to be established in a Canadian medical school. This near-peer team allowed for early practice of non-technical skills in emergency settings. SRST facilitated opportunities for simulation education for both the junior students as participants, and the senior medical students as educators. This is an ongoing initiative, with plans to continue program development in future years.

Keywords: innovations in emergency medicine education, simulation, near-peer teaching

LO21

Mentorship in Canadian emergency medicine residency training programs: a needs assessment

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Introduction: Research supports the role of mentors in the personal development and career advancement of medical trainees. Compared to non-mentored peers, mentored residents are nearly twice as likely to describe excellent career preparation and demonstrate objective career success. In prior research, only 65% of training programs in Canada had a mentorship program, and 40% indicated a need for more formal mentorship models. **Methods:** A needs assessment survey was distributed to RCPSC Emergency Medicine (EM) Program Directors across Canada regarding mentorship available to resident physicians training at their centers. Additionally, all EM resident and staff physicians involved in mentorship were surveyed on their perceptions of current models at their institutions. Both surveys were comprised of binary, open ended, and 5 point likert scale questions. Responses were analyzed using Fisher's exact test. **Results:** Eleven Program Directors responded to the survey. Formal mentorship programs were found in 82% of training centers, with 77% of programs instituted within the past 5 years. Half of resident/mentor pairings were based on a combination of identified career goals, participant personality traits, or resident request. Other pairing methods included perceived resident needs or attending physician request. Most meetings are face-to-face, with one program requiring mutual scheduled shifts. Residents identified that mentorship was significantly associated with benefits to career ($p = 0.0016$) and niche ($p = 0.0019$) development. Formal mentorship was felt to have a significant association with resident academic development ($p = 0.05$) and lower rates of burnout ($p = 0.0018$) by staff physicians. Staff mentors also associated a personal development benefit related to involvement in a mentorship relationship ($p = 0.0355$). **Conclusion:** The majority of EM programs have adopted formal mentorship programs within the past 5 years. Residents and staff identify that mentorship relationships are associated with improved career and niche development as well as academic advancement. Future research will include a before and after study of the implementation of a formal mentorship program within the RCPSC-EM program at the University of Manitoba.

Keywords: mentorship, resident wellness, training

LO22

Implementation of an electronic clinical decision support tool to improve knowledge translation and imaging appropriateness for patients with mild traumatic brain injury and suspected pulmonary embolism

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