

length of stay. We assessed for the occurrence of any SAE (death, arrhythmia, other cardiac and non-cardiac conditions) within 30 days of ED disposition. We used descriptive analysis, unpaired two-tailed t-test and chi-square test. Ethics approval was obtained at all study sites. **Results:** Of 1,475 ED patients with syncope during the study period, 992 (67.3%) arrived by EMS. Mean times (SD) for EMS arrival to the scene, patient assessment at the scene and transfer of patient from scene to the ED were 10.1 (6.4), 18.9 (8.3), and 14.6 (11.5) minutes respectively. Only two patients had critical interventions enroute (pacing and defibrillation). Overall 138 (13.9%) patients suffered a SAE; 32 (3.2%) detected by EMS, 58 (5.8%) detected during ED evaluation, 48 (4.8%) after ED disposition. The average ED length of stay was 5.9(4.2) hours. Based on average of cost from two sites, we estimated that total cost of transporting syncope patients from the scene to the ED to be \$4 million in Canada. The total cost of ED care for syncope patients transported by EMS in Canada was calculated at \$21.5 million. **Conclusion:** A substantial proportion of patients arriving to the ED via EMS suffer no SAE within 30 days. Correspondingly, our results suggest a need for an EMS clinical decision aid to divert low-risk syncope patients to alternative care pathways such as family physicians or rapid access clinics. If developed and implemented, this tool can potentially reduce EMS burden, ED crowding, and reduce healthcare costs.

Keywords: syncope, emergency medical services (EMS), health resource utilization

LO084

Text messaging research participants as a follow-up strategy to decrease emergency department study attrition

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Introduction: Collecting patient-reported follow-up data for prospective studies in the emergency department (ED) is challenging in this acute care, minimal continuity setting. Follow-up is frequently attempted using telephone contact and in some instances mail correspondence. The objective of this study was to determine if text messaging study participants involved in an ongoing randomized trial resulted in a lower rate of attrition as compared to conventional telephone follow-up. **Methods:** This was a secondary analysis of research participants enrolled in a randomized controlled trial assessing head injury discharge instructions. Adult (18-64 years) patients presenting to an academic ED (annual census 65,000) with chief complaint 'head injury' occurring within 24 hours of ED visit were contacted by telephone 2 and 4 weeks post ED visit to complete a symptom questionnaire. During the first 4 months of study follow-up, participants were contacted by a conventional telephone call. Attrition was higher than anticipated, thus we received subsequent ethics approval for the final 3 months of follow-up duration to contact participants by text message on the day of the first telephone attempt as a reminder of the telephone interview scheduled later that day. The proportion of patients lost to follow-up at 2 and 4 weeks post ED visit was compared between participants not receiving and receiving reminder text messages. **Results:** 118 patients were enrolled in the study (78 underwent conventional follow-up and 40 received text messages). Mean (SD) age was 35.2 (13.7) years and 43 (36.4%) were male. During the period of conventional follow-up, 3 participants withdrew from the study. Of the remaining 75 participants, 24 (32.0%) at 2 weeks and 32 (42.7%) at 4 weeks were unable to be contacted. Of the 40 participants receiving a reminder text message, 4 (10.0%) at 2 weeks and 10 (25.0%) at 4 weeks were unable to be contacted. Overall, text messaging study participants decreased attrition by 22% (95% CI: 5.9%, 34.7%) and

17.7% (95% CI: -0.8%, 33.3%) at 2 and 4 week follow-up, respectively. **Conclusion:** In this young ED cohort participating in a randomized trial, text message reminders of upcoming telephone follow-up interviews decreased the rate of attrition. Text messaging is a viable, low-cost communication strategy that can improve follow-up participation in prospective research studies.

Keywords: methodology, communication, follow-up

LO085

Canadian in-hospital mortality for patients with emergency-sensitive conditions

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Introduction: The emergency department (ED) hospital standardized mortality ratio (ED-HSMR) measures risk-adjusted mortality for patients admitted to hospital with conditions for which ED care may improve outcomes (emergency-sensitive conditions). This study aimed to describe in-hospital mortality across Canadian provinces using the ED-HSMR. **Methods:** Data were extracted from hospital discharge databases from April 2009 to March 2012. The ED-HSMR was calculated as the ratio of observed deaths among patients with emergency-sensitive conditions in a hospital during a year (2010-11 or 2011-12) to the expected deaths for the same patients during the reference year (2009-10), multiplied by 100. The expected deaths were estimated using predictive models fitted from the reference year for different hospital peer-groups (teaching, large, medium and small hospitals) adjusted for comorbidities, age, diagnosis, and hospital length of stay. Thirty-seven validated emergency-sensitive conditions were included (e.g., stroke, sepsis, shock). Aggregated provincial ED-HSMR values were derived from patient-level probabilities of death. A HSMR above or below 100 respectively means that more or fewer deaths than expected occurred in hospital within a province. **Results:** During the study period, 1,335,379 patients were admitted to 629 hospitals across 11 provinces and territories with an emergency-sensitive condition as the most responsible diagnosis, of which 8.9% died. More in-hospital deaths (95% confidence interval) than expected were respectively observed for the years 2010-11 and 2011-12 in Newfoundland [124.3 (116.3-132.6) & 117.6 (110.1-125.5)] and Nova Scotia [116.4 (110.7-122.5) & 108.7 (103.0-114.5)], while mortality was as expected in Prince Edward Island and Manitoba, and less than expected in other provinces and territories [Territories 67.3 (48.3-91.3) & 73.2 (55.0-95.5); New Brunswick 87.7 (82.5-93.1) & 90.4 (85.2-95.8); British Columbia 92.0 (89.6-94.4) & 87.1 (84.9-89.3); Saskatchewan 92.3 (87.1-97.4) & 90.8 (86.2-95.6); Ontario 94.0 (92.6-95.4) & 88.0 (86.6-89.3); Alberta 94.1 (91.1-97.2) & 91.0 (88.2-93.9); Québec 95.7 (93.8-97.6) & N/A]. **Conclusion:** Our study revealed important variation in risk-adjusted mortality for patients admitted to hospital with emergency-sensitive conditions among Canadian provinces. The results should trigger more in-depth evaluations to identify the causes for these regional variations.

Keywords: all-cause mortality, performance, quality indicators

LO086

The utility of an inpatient diagnosis-derived Charlson Comorbidity Index to create an emergency department workload model

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Introduction: A previous Canadian emergency department (ED) model determined predictors of increased workload using a manual chart review

to elucidate comorbidities. We designed an electronic algorithm to capture all comorbidities based on the Charlson Comorbidity Index (CCI) for a 5 year period preceding the ED visit from the regional inpatient database. Our objective was to identify predictors correlating with physician time require to treat patients and thus develop a multivariable model to predict physician workload. **Methods:** From May to September 2015, two research assistants (RAs) shadowed a random sample of physicians from the six urban EDs in a single health region. They documented time spent performing clinical and non-clinical functions for patient visits. A linkage with the previously validated regional ED database was used to obtain triage acuity, age, gender, mode of arrival, and CCI scores. Multiple linear regression was used to describe the associations between predictor variables and total physician time per patient visit as well as time spent on history and physical exam and to derive an equation for physician workload. RA inter-rater reliability was assessed on 107 MD-patient interactions. **Results:** Over the 4-month period, 873 patient encounters were documented. Data from 599 completed encounters were included in the model. The median age was 49.4 (SD 22.8) and 52.2% were female. Overall, 16.0% were admitted to hospital, 64.9% of patients were CTAS 1-3, 19.6% of patients arrived by ambulance, and 15.5% of patients had a CCI score of ≥ 1 . The mean time spent on history and physical was 7.0 minutes (SD 4.73) and mean total time was 19.4 minutes (SD 11.6). Using a linear regression model with total time as the dependent and EMS arrival, CTAS, and age as the independent variables, having any CCI score is a significant predictor of total time ($p = 0.03$), with a difference of 2.9 minutes between CCI positive versus negative patients. Higher acuity was the most significant factor associated with time spent with a mean difference of 4.4 minutes per CTAS category. The intraclass correlation coefficient value was 0.99 (95% CI 0.97-1.00) indicating excellent reliability. **Conclusion:** The electronically derived CCI does have value in the development of a physician workload model and can replace the use of manual chart review to define patient comorbidities.

Keywords: Charlson Comorbidity Index, emergency department workload model, administrative database

LO087

Emergency department patients' connection to primary care providers: reasons for lack of connection

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Introduction: Some non-urgent/low-acuity Emergency Department (ED) presentations are considered convenience visits and potentially avoidable with improved access to primary care services. This study surveyed patients who presented to the ED and explored their self-reported reasons and barriers for not being connected to a primary care provider (PCP). **Methods:** Patients aged 17 years and older were randomly selected from electronic registration records at three urban EDs in Edmonton, Alberta (AB), Canada. Following initial triage, stabilization, and verbal informed consent, patients completed a 47-item questionnaire. Data from the survey were cross-referenced to a minimal patient dataset consisting of ED and demographic information. The questionnaire collected information on patient characteristics, their connection to a PCP, and patients' reasons for not having a PCP. **Results:** Of the 2144 eligible patients, 1408 (65.7%) surveys were returned and 1402 (65.4%) were completed. The majority of patients (74.4%)

presenting to the ED reported having a family physician; however, the 'closeness' of the connection to their family physician varied greatly among ED patients with the most recent family physician visit ranging from 1 hour before ED presentation to 45 years prior. Approximately 25% of low acuity ED patients reported no connection with a family physician. Reasons for a lack of PCP connection included: prior physician retired, left, or died (19.8%), they had never tried to find one (19.2%), they had recently moved to Alberta (18.0%), and they were unable to find one (16.5%). **Conclusion:** A surprisingly high proportion of ED patients (25.6%) have no identified PCP. Patients had a variety of reasons for not having a family physician. These need to be understood and addressed in order for primary care access to successfully contribute to diverting non-urgent, low acuity presentations from the ED.

Keywords: access to care, non-urgent

LO088

Development of a simulation-based curriculum for ultrasound-guided internal jugular central venous catheterization

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Introduction / Innovation Concept: Insertion of an internal jugular (IJ) central venous catheter (CVC) under ultrasound guidance (USG) is a complex skill that requires considerable practice in order to achieve technical proficiency. Simulation allows novices to engage in structured and high volume repetitive practice of USG IJ CVC insertion and to work through a predictable pattern of errors prior to real patient encounters. Based on earlier work on learning curves for CVC insertion, this curriculum uses a model of simulation-based high volume deliberate practice of the fundamental skills of USG CVC insertion, and was designed with careful consideration of the conditions associated with optimal learning and improvement of performance. **Methods:** Eight residents (post graduate year 2) from the Departments of Emergency Medicine and Anesthesiology engaged in deliberate practice of USG CVC insertion during three two-hour sessions, at 2-week intervals. Progress of the residents was monitored with direct observation and regular hand motion analysis (HMA), which was compared to performance metrics set by a local expert. **Curriculum, Tool, or Material:** Students reviewed online introductory ultrasound video and articles outlining internal jugular (IJ) and femoral CVC insertion prior to the first session. Session 1 focused on ultrasound skills including knobology, transducer movement, and needle tracking. This was followed by 60 minutes of deliberate practice of the skills of USG CVC insertion on both femoral and IJ models. During sessions 2/3, students practiced complete gowning and draping using sterile technique. This was followed again by deliberate practice of the skills of USG CVC insertion on both femoral and IJ models. Students received coaching and feedback throughout all sessions, with HMA assessment of USG IJ CVC insertion at the beginning and end of each session. After three training sessions, consisting of 85 total attempts, 5/8 residents surpassed the expert benchmark for probe hand motion, 6/8 for needle hand motion, and 1/8 for total procedure time, with the remaining residents approaching the expert benchmark for each metric. **Conclusion:** We have successfully developed a simulation-based curriculum for USG IJ CVC placement. Residents demonstrated continuous improvement in each session, approaching or exceeding the expert benchmarks by the end of the third session.

Keywords: innovations in EM education, simulation, central venous catheterization