

research will evaluate this approach in multiple populations with community based follow-up intervention for those at higher risk.

Keywords: frailty, geriatrics, risk screening

P049

A novel administrative database solution for capturing ED patient co-morbidity - the derived Charlson Comorbidity Index

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Introduction: ED patient comorbidity is difficult to ascertain for research. Traditional surrogates such as triage acuity, admission rate, and age have been used to approximate patient complexity. Differences between EDs for the management of similar conditions are nevertheless difficult to reconcile. The Charlson Comorbidity Index (CCI) contains 19 categories and is a validated predictor of the ten-year mortality for a patient who may have a range of comorbid conditions. CCI is based on the International Classification of Diseases (ICD) diagnosis codes found in administrative data such as the Discharge Abstract Database (DAD). The DAD collects this, and other inpatient information, for all Canadian hospitals. We sought to develop a linkage between the regional ED database and the regional inpatient DAD in order to derive a CCI score for each ED patient as a surrogate of comorbidity. **Methods:** We used regional data from Vancouver Coastal Health (VCH) over a 2.5 year period from April 2013 - September 2015. An algorithm was created to identify CCI conditions in the regional DAD. Whenever a patient visited the ED a query was made to the DAD going back for 5 years to acquire CCI relevant diagnoses and enter these diagnoses as well as the CCI weighting into the ED database. Patient DAD records from VCH were utilized no matter in which ED a patient presented. No information from admissions outside the region was available. **Results:** There were 931,596 regional ED visits made by 446,579 unique patients in a total of 11 EDs (6 urban and 5 rural). In total there were 127,233 patients with a CCI score (13.7% of total visits). The average CCI was 0.40 (SD 1.31) with a range of 0.12 at the urban urgent care centre to 0.52 at the urban tertiary care centre. More isolated rural EDs tended to have higher percentages of patients with CCI scores than community urban EDs. Higher acuity, age, and ambulance arrival, ED death, all correlated to higher CCI scores. The most common CCI conditions were "diabetes with complications" (10/11 EDs) and was present in 35,816 (3.8%) visits and "cancer" (10/11 EDs) present in 34,624 (3.7%) ahead of COPD (26,451 visits) and CHF (25,233 visits). **Conclusion:** Use of the CCI is a novel way to passively capture patient comorbidities without reliance on a data entry technician. Limitations include the inability to link to hospitalization data outside a specific health region.

Keywords: comorbidity, Charlson Comorbidity Index, international classification of diseases (ICD)

P050

Electronic health record perceptions and utilization by physicians in urban emergency departments

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Introduction: In 2006, Alberta implemented an Electronic Health Record called the Alberta Netcare Portal (ANP). The ANP provides provincial read-only access to lab tests, diagnostic imaging, medication information and numerous text reports. There is no computerized order entry, and care is coordinated using a hybrid of paper charting and various electronic systems. Here, we quantify observed ANP use by physician participants providing care in four urban Emergency

Departments (EDs) in Alberta. The results form part of a larger mixed methods research project aimed at detecting broader implications of ANP use for patient care. **Methods:** Between October 2014 and July 2015, ED physicians at four EDs (University of Alberta Hospital [UAH], Grey Nuns Community Hospital [GNCH], Foothills Medical Centre [FMC], Peter Lougheed Centre [PLC]) participated in structured clinical observations. Observations were purposively sampled during the first hours of shifts, when physicians orient themselves to the patients they will see during the rest of their shift, including reviewing available historic patient information. Observers used a tablet based tool to generate a time-stamped record of the information tools used alongside patient care. Information tools included permanent paper records, paper excluding permanent documentation, the ANP, clinical and other applications accessed via desktop computers, and mobile devices. Observers also recorded contextual data, including participant commentary, on paper field notes. **Results:** Across the 4 sites, 142 physicians participated in 376 sessions for a total of 566 observed physician-hours. Participants accessed information in different computerized applications and on paper (i.e., a 'hybrid' care environment). The highest proportion of observed physician time interacting with ANP was observed at the UAH (7.0%-8.1%, all values 95% Confidence Intervals). Physicians spent less time using ANP at GNCH (4.1%-4.8%), which was similar to the Calgary EDs (FMC: 4.4-5.3% and PLC: 5.2%-5.9%). Thematic analysis of field notes showed that ANP acceptance was very high. Patient safety concerns were recorded related to care provided alongside 'hybrid' patient records. **Conclusion:** We found high physician acceptance of ANP based on documented comments and observed usage. We posit a high potential for EHRs such as ANP to support improved care coordination which remains partly realized.

Keywords: electronic health record, medical informatics, decision making

P051

Validation of the Sainte-Justine head trauma pathway for children younger than 2 years of age

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Introduction: The PECARN head CT scan rule helps to identify children at risk of clinically important Traumatic Brain Injury (ciTBI) but many children fall in a grey zone while applying the rule (observation vs. CT scan). The C-3PO rule identifies children at risk of skull fracture. The Ste-Justine Head Trauma pathway comprises both rules for the management of all children younger than two years who suffered a head trauma. The primary objective of this study was to measure the capacity of the Ste-Justine Head Trauma pathway to identify children with ciTBI. **Methods:** This was a retrospective study of all children younger than two years old who visited a university affiliated pediatric emergency department (ED) for a head trauma between Sept. 2013 and Aug. 2015. Participants were all patients admitted for a head trauma and a randomly selected sample of 5% of non-admitted patients. Independent variables of the algorithm were recorded for each patient. The primary outcome was the presence of a ciTBI defined by any of the following secondary to TBI: death, neurosurgery, intubation of more than 24 hours or hospitalization for more than one night. Participants were identified using the computerized database of the ED and all charts were reviewed using a standardized report form. The primary analysis was the proportion of children with ciTBI accurately identified using the pathway. A secondary analysis was to compare the performance of the pathway in comparison to the PECARN rule alone. **Results:** During the study period a total of 2,258 children were seen in the ED for head

trauma. The charts of all hospitalized ($n = 100$) and a sample ($n = 101$) of non-hospitalized children were reviewed. A ciTBI was found in 26 participants (3 neurosurgical interventions, 4 intubated and 26 admitted > one night). Among them, 18 were classified at high risk, 7 at moderate risk and 1 at low risk according to the clinical pathway. Using the PECARN rule alone would have classified 17 at high risk, 5 at moderate risk and 4 at low risk. Using the pathway to the entire population would yield the following risk of cTBI: High-risk: 25%; moderate risk: 1%; low risk < 0.1%. **Conclusion:** The Ste-Justine Head Trauma pathway effectively identifies children younger than two years at risk of ciTBI following head trauma while triaging effectively children at low risk. The pathway is more sensitive than the PECARN rule to identify children at risk of ciTBI.

Keywords: head trauma, children, pathway

P052

The effect of blood alcohol on outcomes in patients with major traumatic brain injury in Nova Scotia

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Introduction: Although alcohol use increases the risk of experiencing a traumatic brain injury (TBI), it remains unclear whether outcomes in alcohol-impaired patients are different from those of unimpaired patients. The objective of this study was to evaluate the effect of alcohol on length of stay (LOS) and mortality in patients with major TBI.

Methods: Using data collected from the Nova Scotia Trauma Registry, we performed a retrospective analysis of all patients with major TBI (defined as having an abbreviated injury score (AIS) head ≥ 3) seen in Nova Scotia hospitals between 2002 and 2013. Patients were compared by blood alcohol concentration (BAC) at time of injury: negative (0-1.9 mmol/L), low (2-21 mmol/L), and moderate/high (≥ 22 mmol/L). A logistic regression model was constructed to test for outcomes and adjusted for the effects of age, gender, location, injury severity score (ISS), and BAC level. **Results:** In a twelve-year period, there were 4152 major TBI patients in Nova Scotia. Alcohol testing was performed in 43% of cases (80% male, mean age 44 ± 20 years), with 48% having a positive BAC. Mean acute LOS was similar for all three BAC groups. Increasing age (odds ratio [OR] = 1.01; $p < 0.001$), high ISS (OR = 4.92; $p < 0.001$), injuries occurring outside of Halifax Regional Municipality (OR = 1.72; $p < 0.001$), and having a lower BAC level (OR = 0.99; $p < 0.001$) independently predicted mortality. **Conclusion:** Our findings suggest that low BAC levels are associated with increased mortality in major TBI patients. Further study is warranted to elucidate alcohol's mechanism in TBI outcomes.

Keywords: alcohol, traumatic brain injury, outcomes

P053

Characteristics and patterns of major traumatic brain injury in Nova Scotia: a 12-year retrospective analysis

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Introduction: Traumatic brain injury (TBI) is a leading cause of death and disability in Nova Scotia. TBI occurs in approximately 50% of major trauma seen annually in the province. The purpose of this study was to describe the characteristics and patterns of major TBI seen in Nova Scotia over a 12-year period. **Methods:** This was a retrospective

case series. Data were obtained from the Nova Scotia Trauma Registry for all patients presenting with major TBI (abbreviated injury score [AIS] head ≥ 3) between 2002 and 2013. Injury rates were calculated on the basis of 100,000 population (all ages) using population estimates from Statistics Canada. **Results:** Overall, 4152 major TBI patients were seen in Nova Scotia hospitals during the study period. Mean age of TBI patients was 51 ± 25 years; 73% were male. The majority of injuries were the result of blunt trauma (93%), with relatively few major TBIs resulting from penetrating trauma (7%). The most common mechanisms of injury were falls (44%) and motor vehicle crashes (27%). Analysis of census-based subpopulations of the province showed that injury rates varied significantly among counties (from 25 to 63 per 100,000 population). We observed an increase in the number of major TBI patients over twelve years. **Conclusion:** Our findings suggest significant regional variation in major TBI rates in Nova Scotia. There are ongoing needs for prevention and intervention efforts that focus on unintentional falls and motor vehicle crashes, especially in older adults. These results also suggest that geographically targeted efforts may be warranted.

Keywords: traumatic brain injury, patterns, retrospective

P054

Development of a hospital-wide program for simulation-based training in trauma care and management

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Introduction: The Queen Elizabeth II Health Sciences Centre (QEII HSC) is a Level I trauma center that provides tertiary care services to the province of Nova Scotia (pop. 940,592) and quaternary care services to Atlantic Canada (population > 2.4 million). The objective of this study was to describe and evaluate the development of an inter-professional hospital-wide trauma simulation that was performed at the QEII HSC in June of 2015. **Methods:** The simulation was performed in the dedicated trauma resuscitation bay in the emergency department of the trauma centre using SimMan equipment. The scenario involved a 35-year-old male pedestrian versus car at approximately 70 km. The patient required immediate resuscitation and transfer to the operating room for an emergency laparotomy. Evaluation of the simulation was through video feedback, time stamping, piloting of resident Trauma Team Activation evaluation, observation for latent safety issues, and participant feedback. Trauma team members were unaware of simulation prior to arrival. **Results:** Feedback received from simulation participants indicated that this exercise was incredibly "real" for them. Using the usual emergency department patient registration proved difficult in this simulation exercise, both for activation of the massive transfusion protocol and transfer of the patient to the operating room. Latent safety issues identified included a lack of communication with the operating room and unavailability of some resuscitation equipment. Debriefing after the event was felt to be important by all participants of the simulation. Having evaluators dedicated to observing specific aspects of the simulation would facilitate these exercises. Patient care was not interrupted in the emergency department or the operating room. **Conclusion:** The in situ simulation was a valuable experience for the trauma program, stakeholders, and all participants. Based on this trial simulation, additional simulations will be held within our trauma program. Further research is required to validate long-term retention of skills and knowledge, and to evaluate the impact of simulation training on staff performance and trauma patient outcomes.

Keywords: trauma, simulation, inter-professional