

atypical simulation. The escape game will launch in MDCN490 for second-year medical students and is scheduled prior to their acute care simulations. Further teamwork challenges identified at that time will help inform teamwork curriculum development for year 3.

**Keywords:** innovations in emergency medicine education, simulation, teamwork

### P135

#### Frequent emergency department use as an independent factor associated with mortality in substance and opioid misuse: a retrospective analysis of linked databases

J. Moe, MD, MSc, MA, C. Camargo, MD, DrPH, R. Davis, ScD, S. E. Jelinski, PhD, DVM, B. H. Rowe, MD, MSc, University of British Columbia Department of Emergency Medicine, Vancouver General Hospital, Vancouver, BC

**Introduction:** Substance and opioid misuse present significant illness burdens in Emergency Departments (EDs). Understanding risk factors for mortality in these patients is urgently needed to allow targeted prevention. This study's objective was to determine whether frequent ED use is independently associated with mortality among patients with substance and opioid misuse, and secondarily, whether degree of frequent use influences mortality risk. **Methods:** This is a retrospective cohort study in Alberta, Canada. National Ambulatory Care Reporting System ED data was linked to Vital Statistics mortality data using postal code, birthdate, and sex. All adults (18 years old at index visit, i.e. first visit made in the study year) with substance or opioid misuse (defined by ICD-10 codes) from April 1, 2012 to March 31, 2013 were included. Frequent use was defined by 5 ED visits in the 12 months prior to index visit. The primary outcome was mortality within 90 days, and secondarily, within 30 days, 365 days, and 2 years post-index visit. Mortality was compared using Kaplan-Meier curves and Cox regression adjusting for age, sex and income. Degree was examined by subcategorizing frequent use into 5-10, 11-15, 16-20, and >20 visits. **Results:** Overall, 16,389 patients made 24,880 visits for substance misuse, and 1787 patients made 2241 visits for opioid misuse. Frequent vs. non-frequent substance misusers were older, more often female, lower income, more often of rural residence, and arrived more by ambulance for lower acuity visits that were hospitalized less often. Compared to frequent substance misusers, frequent opioid misusers were more often female, of non-rural residence, arrived less often by ambulance, and made higher acuity visits that were hospitalized more often. Among substance misuse patients, 97.1% (95% CI: 96.6, 97.7) of frequent users vs. 98.0% (95% CI: 97.7, 98.2) of non-frequent users were alive at 2 years. Frequent use was significantly associated with mortality at 365 days (HR 1.36 [95% CI: 1.04, 1.77]) and 2 years (HR 1.32 [95% CI: 1.04, 1.67]) but not at 90 or 30 days. Subcategorized by degree, frequent use was significantly associated with mortality only for patients with >20 visits/year at 365 days (HR 1.88 [1.03, 3.44]) and 2 years (HR 1.89 [1.10, 3.22]). Among opioid misuse patients, there was no difference in mortality between frequent and non-frequent ED users at any time point. However, subcategorized by degree, a significant association was seen for those with 16-20 visits/year at 365 days (HR 3.62 [95% CI: 1.13, 11.66]), and 2 years (HR 3.37 [95% CI: 1.05, 10.81]). **Conclusion:** In substance misuse patients, frequent ED use was significantly associated with long-term but not short-term mortality. Mortality risk for substance and opioid misuse patients was concentrated in extremely frequent users suggesting that the highest frequency presenters should be targeted for prevention.

**Keywords:** substance-related disorders, opioid-related disorders, public health

### P136

#### Evaluating the use of the YEARS clinical decision rule for diagnosing pulmonary embolism in the emergency department

S. Sharif, MD, C. Kearon, MB, PhD, M. Eventov, BSc, M. Li, MD, R. Jiang, P. Sneath, BSc, R. Leung, K. de Wit, MBChB, MSc, MD, Department of Medicine, Division of Emergency Medicine, McMaster University, Hamilton, ON

**Introduction:** Diagnosing pulmonary embolism (PE) can be challenging because the signs and symptoms are often non-specific. Studies have shown that evidence-based algorithms are not always adhered to in the Emergency Department (ED) and are often not used correctly, which leads to unnecessary CT scanning. The YEARS diagnostic algorithm, consisting of three items (clinical signs of deep vein thrombosis, hemoptysis, and whether pulmonary embolism is the most likely diagnosis) and D-dimer, is a novel and simplified way to approach suspected acute PE. The purpose of this study was to 1) evaluate the use of the YEARS algorithm in the ED and 2) to compare the rates of testing for PE if the YEARS algorithm was used. **Methods:** This was a health records review of ED patients investigated for PE at two emergency departments over a two-year period (April 2013-March 2015). Inclusion criteria were ED physician ordered CT pulmonary angiogram, ventilation-perfusion scan, or D-dimer for investigation of PE. Patients under the age of 18 and those without a D-dimer test were excluded. PE was considered to be present during the emergency department visit if PE was diagnosed on CT or VQ (subsegmental level or above), or if the patient was subsequently found to have PE or deep vein thrombosis during the next 30 days. Trained researchers extracted anonymized data. The rate of CT/VQ imaging and the false negative rate was calculated.

**Results:** There were 1,163 patients that were tested for PE and 1,083 patients were eligible for our analysis. Of the total, 317/1,083 (29.3%; 95% CI 26.6-32.1%) had CT/VQ imaging for PE, and 41/1,083 (3.8%; 95% CI 2.8-5.1%) patients were diagnosed with PE at baseline. Three patients had a missed PE, resulting in a false negative rate of 0.4% (95% CI 0.1-1.2%). If the YEARS algorithm was used, 211/1,083 (19.5%; 95% CI 17.2-22.0%) would have required imaging for PE. Of the patients who would not have required imaging according to the YEARS algorithm, 8/872 (0.9%; 95% CI 0.5-1.8%) would have had a missed PE. **Conclusion:** If the YEARS algorithm was used in all patients with suspected PE, fewer patients would have required imaging with a small increase in the false negative rate.

**Keywords:** pulmonary embolism, D-dimer, diagnosis

### P137

#### Automation of follow-up microbiology culture results in patients discharged from the emergency department

D. M. Shelton, MD, MSc, D. Hefferon, P. Sinclair, Z. Janicijevic, BScPA, Sunnybrook Health Sciences Centre, Toronto, ON

**Introduction:** At Sunnybrook Health Sciences Centres Emergency Department (ED), delays occurred in reporting positive microbiology culture results of patients discharged from the ED. Follow-up of culture results was driven by a manual paper based process that was inefficient and resulted in a one to three day delay in reporting results. The previous system was time consuming, labour intensive and prone to human error. Timely reporting of microbiology culture results is important to ensuring that patients receive optimal care. The aim is that >80% of positive microbiology culture results of patients discharged from Sunnybrook Health Sciences Centre ED will be followed-up within 24 hours of results being available from the lab. **Methods:** Outcome Measure Percentage of positive culture results followed up

within 24 hours Process Measure Time from availability of culture results from lab to completion of patient follow-up Balancing Measure Number of positive culture results not displayed in ED server Change Idea Electronically push positive culture results to an ED server that is periodically checked daily and acted upon. An electronic interface was created to capture positive results from the microbiology lab in real time. **Results:** There was a 45 hour reduction in the mean time to complete a patients follow-up of culture results (59 hours pre vs. 14 hours post,  $p=0.03$ ). We surpassed our aim of >80% follow-up within 24 hours. **Conclusion:** A significant reduction to completing a patients follow-up of microbiology culture results was achieved by automating the availability of results and eliminating the manual process previously used in relaying results from the microbiology lab to ED. This new process has the following benefits: 1) Improves timely reporting of culture results to patients, that may require initiation or change in antibiotics 2) Enhanced patient safety due to elimination of human error 3) Decreased workload due to elimination of batching of results and data entry 4) Entire process is streamlined, since only positive culture results are transmitted for follow-up.

**Keywords:** quality improvement and patient safety, microbiology culture results, follow-up

### P138

#### Using electronic health record data to assess emergency medicine trainees independent and interdependent performance: a qualitative perspective on measuring what matters

L. Shepherd, MD, S. Sebok-Syer, PhD, L. Lingard, PhD, A. McConnell, MD, R. Sedran, MD, MSc, A. Dukelow, MD, MHSC, Western University, London, ON

**Introduction:** Competency-based medical education (CBME) affirms that trainees will receive timely assessments and effective feedback about their clinical performance, which has inevitably raised concerns about assessment burden. Therefore, we need ways of generating assessments that do not rely exclusively on faculty-produced reports. The main object of this research is to investigate how data already collected in the electronic health record (EHR) might be meaningfully and appropriately used for assessing emergency medicine (EM) trainees independent and interdependent clinical performance. This study represents the first step in exploring what EHR data might be utilized to monitor and assess trainees clinical performance **Methods:** Following constructivist grounded theory, individual semi-structured interviews were conducted with 10 EM faculty and 11 EM trainees, across all postgraduate years, to identify EHR performance indicators that represent EM trainees independent and interdependent clinical actions and decisions. Participants were presented with a list of performance indicators and asked to comment on how valuable each would be in assessing trainee performance. Data analysis employed constant comparative inductive methods and occurred throughout data collection. **Results:** Participants created, refined, and eliminated performance indicators. Our main result is a catalogue of clinical performance indicators, described by our participants, as reflecting independent and/or interdependent EM trainee performance that are believed to be captured within the EHR. Such independent indicators include: number of patients seen (according to CTAS levels), turnaround time between when a patient is signed up for and first orders are made, number of narcotics prescribed. Meanwhile, interdependent indicators include, but are not limited to, length of stay, bounce-back rates, ordering practices, and time to fluids. **Conclusion:** Our findings document a process for developing EM trainee report cards that incorporate the perspectives of clinical faculty and trainees. Our work has important implications for

distinguishing between independent and interdependent clinical performance indicators.

**Keywords:** electronic health records, postgraduate education, performance indicators

### P139

#### How available is availability bias? Examining factors that influence diagnostic error

J. Sherbino, MD, MEd, S. Monteiro, J. Ilgen, MD, E. Hayden, MD, E. Howey, G. Norman, McMaster, University, Hamilton, ON

**Introduction:** Cognitive bias is often cited as an explanation for diagnostic errors. Of the numerous cognitive biases currently discussed in the literature, availability bias, defined as the current case reminds you of a recent similar example is most well-known. Despite the ubiquity of cognitive biases in medical and popular literature, there is surprisingly little evidence to substantiate these claims. The present study sought to measure the influence of availability bias and identify contributing factors that may increase susceptibility to the influence of a recent similar case. **Methods:** To investigate the role of prior examples and category priming on diagnostic error at different levels of expertise, we devised a 2 phase experiment. The experimental intervention was in a validation phase preceding the test, where participants were asked to verify a diagnosis which was either i) representative of Diagnosis A, and similar to a test case, ii) representative of Diagnosis A and dissimilar to a test case, iii) representative of Diagnosis B and similar to a test case. The test phase consisted of 8 written cases, each with two approximately equally likely diagnoses (A or B). Each participant verified 2 cases from each condition, for a total of 6. They then diagnosed all 8 test cases; the remaining 2 test cases had no prior example. All cases were counter-balanced across conditions. Comparison between Condition i) and ii) and no prior showed effect of prior exemplar; comparison between iii) and no prior showed effect of category priming. Because cases were designed so that both Diagnosis A and B were likely, overall accuracy was measured as the sum of proportion of cases in which either was selected. Subjects were emergency medicine staff ( $n=40$ ), residents ( $n=39$ ) and medical students ( $n=32$ ) from McMaster University, University of Washington, and Harvard Medical School. **Results:** Overall, staff had an accuracy (A + B) of 98%, residents 98% and students 85% ( $F=35.6$ ,  $p<0.0001$ ). For residents and staff there was no effect of condition (all mean accuracies 97% to 100%); for students there was a clear effect of category priming, with accuracy of 84% for i), 87% for ii) and 94% for iii) but only 73% for the no prime condition (Interaction  $F=3.54$ ,  $p<0.002$ ) **Conclusion:** Although prior research has shown substantial biasing effects of availability, primarily in cases requiring visual diagnosis, the present study has shown such effects only for novices (medical students). Possible explanations need to be explored. Nevertheless, our study shows that with increasing expertise, availability may not be a source of error.

**Keywords:** diagnosis, availability bias

### P140

#### Risk factors for adverse outcomes in hyperglycemic patients presenting to the emergency department: a systematic review

L. Siddiqi, HBSc, K. Van Aarsen, MSc, A. Iansavitchene, MLIS, J. W. Yan, MD, MSc, Schulich School of Medicine and Dentistry, Western, University, London, ON

**Introduction:** Hyperglycemia is a significant cause of morbidity and mortality, often resulting in adverse outcomes such as recurrent ED