

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

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

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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

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

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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

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

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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