P023

Code Resus - using a quality improvement approach to improve health care provider response during resuscitations

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Introduction: In order to achieve the best possible outcomes for patients requiring resuscitation (PRRs) in the emergency department (ED), health care providers (HCPs) must provide an efficient, multidisciplinary and coordinated response. A quality improvement (QI) project was undertaken to improve HCP response to PRRs at two tertiary care hospital EDs in Toronto. **Methods:** We conducted a before-and-after mixed-method survey to evaluate the perception of the adequacy of HCP response and clarity of HCP role when responding to PRRs. The results were compared using the Chi-square test. Qualitative responses to the first survey were also used to inform the development of the QI project. Through interviews of key stakeholders and with continuous input from front-line ED HCPs, a multi-disciplinary team modified the ED resuscitation protocol. This included standardized pre-hospital communication form with paramedics, ED-wide overhead announcement of 'Code Resus', dedicated HCPs assigned to respond to PRRs, and specific duties assigned to each responder. Change initiatives were reinforced through education and posters in the ED. Six months after implementation, a second survey was conducted to evaluate the sustained effects of the intervention. **Results:** Baseline measures indicated that 16 of 52 (30.8%) nurses surveyed believed their role was often or always apparent to themselves and others when they attended to a PRR (on a 5-point rating scale). This proportion increased to 35 of 55 (63.6%) nurses in the post-implementation survey ($p < 0.001$). Regarding adequacy of the number of HCPs responding to PRRs, 17 of 39 (43.6%) physicians and 23 of 53 (43.4%) nurses surveyed thought the appropriate number of HCPs responded to PRRs; the remainder thought that there were too few or too many HCPs. In the post-implementation survey, 34 of 41 (82.9%) physicians ($p < 0.001$) and 36 of 56 (64.3%) nurses ($p = 0.029$) surveyed felt that the appropriate number of HCPs attended to PRRs. **Conclusion:** Using a quality improvement approach, we identified and quantified perceived deficiencies in HCP response to PRRs in the ED. Through feedback-based modifications of the ED resuscitation protocol and by engaging HCP stakeholders, change initiatives were implemented to improve HCP response. As a result, this project achieved significant and sustained improvements in HCPs' perceived response to PRRs.

Keywords: quality improvement, resuscitation

P024

Extracurricular podcast use behaviour and effect on knowledge retention in undergraduate medical students

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Introduction: Podcasts have become increasingly popular as a medium for free online access medical education (FOAM). However, little research has examined the naturalistic use of podcasts as a tool in undergraduate medical education. This study aims to determine usage conditions, preferences, and level of retention of information from podcasts by medical students at a Canadian University. **Methods:** Medical students (Years 1 to 3) were instructed to complete an online test assessing their baseline knowledge on the topics of the podcasts and for qualitative data on podcast usage and preferences. Audio podcasts on two topics (adult asthma, and introduction to toxicology) were then distributed to study participants. One week and two weeks after the initial survey students were asked to complete a follow-up survey for knowledge assessment and further podcast usage data. Simple descriptive statistical generated using Microsoft Excel. Paired samples t-tests were utilized to assess knowledge acquisition using Microsoft SPSS version 23. **Results:** Participants who successfully completed the knowledge assessments demonstrated a significant effect of learning (Asthma, average test score improvement of 30%, $p = 0.002$; Toxicology, average test score improvement of 13%, $p = 0.004$). The majority of participants who stated a preference in podcast length indicated they preferred podcasts of 30 or less minutes (85%). The top three activities participants were engaged in while listening to the podcasts were driving (46%), completing chores (26%), and exercising (23%). A large number of participants who did not complete the study in its entirety cited a lack of time and podcast length to be the top two barriers to completion. **Conclusion:** This is one of the first studies to examine podcast usage data and preferences in a Canadian undergraduate medical student population. This information may help educators and FOAM producers to optimize educational tools for medical education.

Keywords: medical education, podcast

P025

Optimizing practice for learning emergency department transthoracic echocardiography using an ultrasound simulator

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Introduction: Emergency department (ED) transthoracic echocardiography (TTE) is an important application of emergency department bedside ultrasound. Given limited curricular hours and economic constraints, training using ultrasound simulators represents an attractive alternative to using live-human models. Despite increased uptake of ultrasound simulator technology, educators lack evidence informing how best to use this technology. Three educational paradigms will be explored in this study: self-guided theory (learners are able to determine when they have had "enough practice"), desirable difficulties (manipulating practice conditions to create more durable and flexible learning), and the challenge point framework (avoiding cognitive overload). The question we seek to answer is: in novice medical trainees, which practice condition leads to improved learning in a test of retention when assessing the ability to generate and interpret a parasternal long axis (PLAX) and apical four-chamber view (A4CH) of the heart? **Methods:** Ultrasound-novices will be recruited from rotators in the ED. Participants will be allocated to one of three groups based on a 2x2 orthogonal design: Group A (variable difficulty × self-determined practice); Group B (variable difficulty × fixed practice); Group C (static difficulty × fixed practice). A standardized didactic lecture will be presented to each participant. Practice conditions with respect to difficulty level (easy, medium, hard) and structure of practice (learner-determined or fixed practice) will vary according to assigned groups. All groups will receive standardized feedback. The ability to identify anatomy and pathology will be assessed. At the conclusion of practice, a post-practice skills assessment and survey will be administered. Two to three weeks later, participants will be retested using three case scenarios. Screenshots of the participant-determined "best image" and video of the performance will be taken to be evaluated by two blinded (to group allocation) reviewers. **Results:** We have currently enrolled 14 participants. We aim to complete enrollment by April 2016. **Conclusion:** We anticipate that our study will provide evidence to inform the best use of ultrasound simulators for teaching TTE in the ED. It will also provide insight into the ability of three educational theories to predict best learning using a novel educational intervention.

Keywords: ultrasound, simulation, echocardiography

P026

Pilot-testing an adverse drug event documentation form prior to its implementation in an electronic health record

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Introduction: Adverse drug events (ADEs), harmful and unintended consequences of medications, account for 1.7M emergency department (ED) visits in Canada each year. Up to 30% are due to unintentional re-prescribing of culprit drugs, partly due to lack of accessible, succinct, and comprehensible ADE information at the time of prescribing. Through a systematic review and workshops with physicians and pharmacists, we designed new ADE documentation fields. Our objective was to pilot-test the fields to anticipate and address problems prior to their integration into an electronic medical record (EMR). **Methods:** We seek to introduce structured ADE documentation into an EMR and PharmaNet, BC's medication-dispensing database, to generate patient-level alerts when attempts to re-prescribe culprit drugs are made. We conducted this qualitative study in the EDs and on the wards of two BC hospitals. The ADE fields collect information about the culprit drug, its effect on the patient, treatment and outcome. We recruited a convenience sample of pharmacists, and distributed paper forms with the ADE fields to them before data collection shifts. We recorded how pharmacists evaluated patients for ADEs and completed the forms. We collected completed forms, and conducted semi-structured interviews for feedback. We analyzed data for common themes using inductive reasoning and constant comparison methods. **Results:** We observed 6 pharmacists documenting 24 ADEs. The field design was perceived as simple, clear, with sufficient detail to capture ADE information. Users identified fields to be omitted (*e.g.,* excess details of culprit drug), modified (*e.g.,* reporting options), or needing clarification (*e.g.,* treatment details). Users were uncertain about what to report when the differential diagnosis included an ADE, but diagnostic uncertainty remained. Thus, ADE fields should enable communication about suspected events and potential alternative diagnoses. Pharmacists required follow-up in some cases to complete their determination (e.g., *C. difficile toxin assay),* emphasizing the need to be able to modify an ADE report. **Conclusion:** Paper-based pilot testing uncovered barriers to ADE documentation, and allowed us to plan for modifications and required linkages between electronic systems. In order to be functional, electronic ADE documentation must be dynamic, representing a departure from previous reporting platforms.

Keywords: patient safety, adverse drug events, electronic medical records

P027

Emergency medical services (EMS) assist-requiring hypoglycemia in Southwest Ontario

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Introduction: Hypoglycemia is a common treatment consequence in diabetes mellitus (DM) and the second most common cause of Emergency Department (ED) visits for adverse drug events. Prior studies have examined the rates of ED visits and inpatient hospitalizations for hypoglycemia. These represent only a small proportion of severe hypoglycemic events, as many do not present to hospital. To date, there have been no Canadian population-based studies examining the rates of EMS assist-requiring hypoglycemia in DM patients in the pre-hospital setting. The objective of this study was to determine the prevalence and describe the EMS assist-requiring hypoglycemia in DM patients in Southwestern Ontario. **Methods:** A population-based retrospective cohort study was conducted on all EMS calls for diabetic emergency from 2008-2014 in Southwestern Ontario, Canada. Data was extracted from the electronic ambulance call records for 11 EMS services in the region. **Results:** There were 9,265 EMS calls for a diabetic emergency (mean age 59 $\pm$ 20 years, 57% male, 82% DM). For 223 calls (2.4%) patients were younger than 19 years of age. The mean blood glucose level on presentation was 2.49 $\pm$ 1.02 mmol/L and 2,116 (24%) call subjects had initial GCS score less than 9. Treatment (intravenous glucose or IM glucagon) was given in 7,126 (77%) calls. There were 3,884 (51 %) hypoglycemia episodes with documented insulin use and 1,436 (19 %) documented oral hypoglycemia agents use. Between 2008 and 2014, rates of calls increased by 7.4% ($p < 0.0001$). Prevalence of hypoglycemia calls during the study period was estimated at 189 per 10,000 diabetes patients per year. In 2,297 (24.8%) instances, the patient refused transport to the ED. **Conclusion:** The rates of EMS assist-requiring hypoglycemia are almost double the rates of hospitalization/ED visits for acute DM complications in our region. Many life threatening episodes of hypoglycemia may go unreported and subsequently not followed by the patient's primary health care provider. Further assessment and proper education following those episodes may help decrease the rate of severe hypoglycemia.

Keywords: hypoglycemia, emergency medical services (EMS)

P028

Implementation of an emergency department outpatient deep venous thrombosis treatment guideline: a quality improvement initiative

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Introduction: Deep venous thrombosis (DVT) is a common diagnosis in the Emergency Department (ED). Despite evidence that Rivaroxaban is non-inferior to the low molecular weight heparin (LMWH) bridge to Warfarin approach for anticoagulation, there is still variability in physician practice. A collaborative ED-Hematology quality improvement initiative, that included a treatment guideline and increased access to a thrombosis clinic, was introduced to guide anticoagulation. **Methods:** A retrospective chart review of ED patients with DVT one-year pre (April 1, 2013-March 31, 2014) and one-year post (April 1, 2014-March 31, 2015) implementation of an outpatient DVT treatment guideline was conducted. Primary outcomes were percentage of patients discharged from the ED on Rivaroxaban or LMWH/Warfarin. Secondary outcomes included mean ED length of stay (ED LOS), mean number of return ED visits per patient and percentage of thrombosis clinic referrals. Balance measures included percentage of return ED visits with pulmonary embolism (PE) within one month and percentage of return ED visits with bleeding (major bleeding or clinically relevant non-major bleeding) due to anticoagulation use. Clinical and administrative data was extracted with 15% independently reviewed for inter-rater reliability. **Results:** 95 patients met inclusion criteria (52 patients pre and 43 post guideline implementation). The prescribing of Rivaroxaban increased from 9.6% (5/52) to 62.7% (27/43). Mean ED LOS for the Rivaroxaban group was 7.5 hours (95% CI, 5.8-9.2) versus 10.0 hours in the Warfarin group (95% CI, 8.5-11.4) [$p = 0.04$]. The mean return ED visits for the Rivaroxaban group was 0.2 (95% CI, 0-0.3) versus 3.9 in the Warfarin group (95% CI, 3.2-4.6) [$p < 0.001$]. The thrombosis clinic referrals increased from 29.5% (13/44) to 86.0% (37/43). There was one PE

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