

positive improvement on all learning objectives of the curriculum. A reflective critique provides insight into lessons learned from delivering this curriculum and future directions for this curriculum. This learner-centered curriculum with innovative teaching methods and a considerable number of active learning strategies has encouraged the learners to take responsibility for their own learning. While this curriculum took place in the medical school, it can apply equally to learners completing their EM clerkship in a community or tertiary Emergency Department.

Keywords: innovations in emergency medicine education, undergraduate education, active learning

P157

Pain management post-emergency department discharge: how are analgesics being consumed by patients with ongoing pain?

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Introduction: Pain management is a cornerstone of emergency department (ED) practice, yet ongoing pain after ED discharge and return visits for inadequate analgesia are common. Over-the-counter (OTC) acetaminophen and nonsteroidal anti-inflammatory drugs are widely accepted first line agents for mild to moderate pain. Previous research has not investigated how patients actually consume such agents after discharge, and if they consume them synergistically and at sufficient doses for optimal analgesia. We sought to determine the proportion of patients in ongoing pain post-discharge that were utilizing analgesics as well as the type and dose of agent(s) used. **Methods:** Adults presenting to our ED with an acutely painful musculoskeletal complaint during research assistant hours were eligible for enrollment. After excluding non-English speakers as well as admitted, pregnant/breast-feeding, and chronic pain patients, consenting subjects completed in-person questionnaires during their ED stay and a follow-up telephone interview 2-3 days later. **Results:** 158 individuals were approached during the study period, of which 99 enrolled. 78 completed follow-up. At follow-up, 71 (91%) individuals experienced ongoing pain with a median score of 5 (interquartile range (IQR) 3-6) on an 11-point scale. 48 (67%) of patients still in pain consumed analgesics in the preceding 24 hours. The most commonly used agents were acetaminophen by 18 individuals (38% of analgesic users), ibuprofen by 16 (33%), and naproxen by 9 (19%). 29 respondents (60% of analgesic users) were using solely oral OTC analgesics. Only 15 (31% of analgesic users) used multiple agents concurrently, and 11 (23%) used prescription opioids. Acetaminophen was used at a median daily dose of 1500mg (IQR 1000-2000mg), much lower than that recommended for maximal analgesia (4000mg). Ibuprofen daily doses (1200mg, IQR 800-1300mg) were slightly lower than typical recommended doses (1600mg, 400mg every 6 hours). **Conclusion:** Only two-thirds of patients with ongoing pain at 2-3 days post-ED discharge were consuming analgesics, most commonly acetaminophen and ibuprofen. Of patients using analgesics, less than one-third used multiple agents. OTC medications are not used by most patients at doses for maximal analgesia. It may be possible to reduce pain burden and repeat-visits in discharged ED patients by optimizing the use of OTC analgesics.

Keywords: analgesia, pain management

P158

Sensitivity analysis of CTAS temperature modifier in the emergency department

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Introduction: The importance of early recognition and treatment of Sepsis has been emphasized over the last several years. In an attempt to better prioritize these patients, the Canadian Triage and Acuity Scale (CTAS) revised the adult temperature modifier after 2008 to define fever as 38.0C or higher and apply SIRS criteria, appearance and immunocompromise to assign a CTAS level of 2, 3, or 4. Prior to 2008, the fever threshold was defined as 38.5C and SIRS criteria were not included. This study looks to see if these changes increased the sensitivity of the temperature modifier. **Methods:** This study is a retrospective cohort analysis of patients presenting with a temperature of <36.0C or >38.0C to six Edmonton-area EDs in calendar years 2008 (n = 26181) and 2012 (n = 51622). Outcomes of interest included the temperature modifier predicted score and the actual assigned CTAS score. Data was extracted from the HASS/iSoft EDIS database including: presenting complaint, vital signs, CTAS score, and applied CTAS modifier to generate a before and after comparison of the actual and theoretical impact of temperature modifier revisions on the CTAS score, for both time periods. **Results:** Applying the pre-2008 temperature modifier to the 2008 patient cohort assigned 11.5% to CTAS 2, 39.8% to CTAS 3, and 33.3% to CTAS 4. Applying the post-2008 revised temperature modifier assigned 22.2% CTAS 2, 41.9% CTAS 3, and 27.6% CTAS 4. Carrying out the same analysis on the 2012 patients pre-results were 12.4% CTAS 2, 46.4% CTAS 3, 30.2% CTAS 4; and the post results were 21% CTAS 2, 47.7% CTAS 3, and 25% CTAS 4. Differences between pre- and post-results were statistically significant (p < 0.0001) in both years. The actual triage scores in 2012 were 18.7% CTAS 2 indicating the temperature modifier was not always correctly applied and 50.6% CTAS 3 as other modifiers were sometimes applied. **Conclusion:** There was a significant increase in sensitivity following the post 2008 revisions to the CTAS temperature modifier when applied to two large ED patient cohorts. The differences between theoretical and actual CTAS scores was less dramatic as nurses were able to apply other first order or special modifiers to assign an appropriate score. Further analysis will be carried out to determine the impact of the temperature modifier revisions on time to antibiotic and admission rates.

Keywords: triage, sepsis, sensitivity

P159

Identifying the cause for inappropriate urine cultures in a Canadian urban academic emergency department

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Introduction: Inspired by the Choosing Wisely® campaign, St. Michaels Hospital (SMH) launched an initiative to reduce unnecessary tests, treatments and procedures that may cause patient harm. Stakeholder engagement identified inappropriate ordering of urine culture & sensitivities (C&S) in the emergency department (ED) as a focus area. Inappropriate urine C&S increase workload, healthcare costs and detection of asymptomatic bacteriuria which can lead to unnecessary antibiotics. The project's purposes were to describe the scope of inappropriately ordered urine C&S in the SMH ED and to conduct a root-cause analysis to inform future quality improvement interventions. **Methods:** Criteria for determining appropriateness was developed a priori using evidence-based guidelines from the University Health Network together with additional literature review. A retrospective chart review was performed on all urine C&S ordered in the ED from Jun 1 Aug 30, 2016. Each chart was reviewed for order appropriateness, demographic information and ordering provider. All inappropriate urine C&S were reviewed to identify root causes which were then grouped

into common themes. A pareto chart was constructed to analyze the frequency of causes. **Results:** Of 425 urine C&S ordered, 75 (17.7%) were inappropriate. The top 3 reasons were: inappropriate urosepsis work-ups (53%), order processing errors (17%) and inappropriate work-ups for weakness (16%). Inappropriate urosepsis work-ups were defined as urine C&S that were ordered empirically despite there being a clear focus for infection elsewhere (i.e. cough, cellulitis) and in the absence of urinary symptoms. Order processing errors were defined as urine C&S which were sent despite there being no documented order. Inappropriate testing was more likely to occur overnight, in females and when a urine routine and microscopy was not ordered prior to C&S. 29% of patients with inappropriate C&S received antibiotics. **Conclusion:** 17.7% of urine C&S ordered in the SMH ED during the 3-month study period were inappropriate. The top cause was septic patients who were empirically tested despite having another source for infection identified from the outset. A possible reason for this is the recent ED emphasis on early recognition of sepsis which may encourage early use of antibiotics and empiric urine C&S. One question to resolve is whether a 17.7% overutilization rate is sufficient to make it a target for change. Interventions designed to reduce inappropriate urine C&S may inadvertently increase the number of missed cultures in patients admitted with sepsis not yet diagnosed. Next steps involve discussions between the ED, Internal Medicine, Infectious Disease and Microbiology, and patient partners to identify patient-centered change ideas and sustainable strategies. This may involve establishing guidelines for ordering urine C&S and incorporating lab services to provide oversight into urine C&S processing.

Keywords: quality improvement and patient safety, emergency department, urine culture

P160

Outpatient parenteral antibiotic therapy following emergency department treatment of non-purulent skin and soft tissue infections: a descriptive analysis

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Introduction: Emergency department (ED) patients with non-purulent skin and soft tissue infections (SSTIs) requiring intravenous antibiotics may be managed via outpatient parenteral antibiotic therapy (OPAT). To date, there are no prospective studies describing the performance of an ED-to-OPAT clinic program. Furthermore, there are no studies that have examined physician rationale for intravenous therapy, despite this being a critical first step in the decision to refer to an OPAT program. **Methods:** We conducted a prospective observational cohort study of adults (age 18 years) with non-purulent SSTIs receiving parenteral therapy at two tertiary care EDs. Patients were excluded if they had purulent infections or could not provide consent. The emergency physician completed a form documenting rationale for intravenous therapy, infection size, and choice of antimicrobial agent, dose and duration. OPAT treatment failure was defined as hospitalization after a minimum of 48 hours of OPAT for: (i) worsening infection; (ii) peripheral intravenous line complications; or (iii) adverse antibiotic events. Patient satisfaction was assessed at a 14-day telephone follow up. **Results:** We enrolled a consecutive sample of 153 patients (mean age 60 years, 82 male (53.6%) and 38 (24.8%) with diabetes). A total of 137 patients (89.5%) attended their clinic appointment. Of the 101 patients prescribed cefazolin, 50.5% received 1000 mg and 48.5% received 2000 mg per day. There were low rates of OPAT treatment failure (3.9%).

None of the adverse peripheral intravenous line events (9.8%) or adverse antibiotic events (7.2%) required hospitalization. Patients reported a high degree of satisfaction with timeliness of clinic referral (median score 9 out of 10) and overall care received (median score of 10 out of 10). The top 5 reasons given by physicians for selecting intravenous therapy were: clinical impression of severity (52.9%); failed oral antibiotic therapy (41.8%); diabetes (17.6%); severe pain (7.8%); and peripheral vascular disease (7.8%). **Conclusion:** This is the first study to identify physician rationale for the use of intravenous antibiotics for SSTIs. There was significant variability in antibiotic prescribing practices by ED physicians. This prospective study demonstrates that an ED-to-OPAT clinic program for non-purulent SSTIs is safe, has a low rate of treatment failures and results in high patient satisfaction.

Keywords: cellulitis, intravenous antibiotics, outpatient parenteral antibiotic therapy

P161

Emergency department visits for hyperglycemia in emerging adults with diabetes: a health records review

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Introduction: Patients with diabetes who are in emerging adulthood, defined as the life stage between 18-29 years, have unique challenges in managing their illness and are at risk of acute complications and loss to follow-up. The study's objective was to describe emergency department (ED) utilization for hyperglycemia in emerging adults with diabetes and to characterize 30-day outcomes including return visits and admission for hyperglycemia. **Methods:** This was a health records review of emerging adults presenting over a one-year period to four tertiary care EDs with a diagnosis of hyperglycemia, diabetic ketoacidosis or hyperosmolar hyperglycemic state. Research personnel collected data on patient characteristics, treatment, disposition, and determined if patients returned to the ED for hyperglycemia within 30 days. Descriptive statistics were used to summarize the data where appropriate. **Results:** There were 185 ED encounters for hyperglycemia, representing 116 unique emerging adult patients. Mean (SD) age was 23 (3.5) years and 50.9% were female. 80 (69.0%) had known type 1 diabetes, 11 (9.5%) had type 2, and 25 (21.5%) were newly diagnosed in the ED. Of 185 visits, 98 (53.0%) resulted in hospital admission. 56 (30.3%) returned to the ED for hyperglycemia within 30 days of their initial encounter, and 21 (11.4%) resulted in admission on this subsequent visit. **Conclusion:** We characterized ED utilization and 30-day outcomes of emerging adults with diabetes for hyperglycemia. Future research should focus on earlier identification of those at higher risk for recurrent ED visits or admission and the efficacy of interventions to prevent these adverse outcomes.

Keywords: diabetes mellitus, hyperglycemia, emerging young adults

P162

Patient-important outcomes in hyperglycemia after discharge from the emergency department: a prospective cohort study

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Introduction: Hyperglycemic emergencies, including diabetic ketoacidosis (DKA) and hyperosmolar hyperglycemic state (HHS), carry