Consultant, Laboratory and Information Services. Data was analyzed using run chart rules. Intervention: a) Removed rarely used tests from electronic nursing order sets b) Uncoupled order panels c) Developed six presentation-based medical directives with appropriate blood testing. d) Staff education Family of measures Outcomes: percent of targeted uncoupled test per 1000 ED visits for each of AST to ALT, GGT to ALT, aPTT to INR, and CK to troponin; Total number of blood tests ordered per 1000 ED visits Process: number of "separate and hold" tubes; number of blood tubes used in the ED; proportion of staff attending education Balancing: volume of blood drawn; LOS **Evaluation/Results:** Outcome: Estimated relative reduction in proportion of all uncoupled tests per 1000 ED visits by: • 33% AST/ALT • 52% GGT/ALT • 50% CK/troponin •18% aPTT/INR Total number of lab tests per 1000 ED visits decreased by 7.7% (5742 to 5331). Evidence of special cause variation on all outcomes. Process measures: 1. 100% reduction in weekly "Separate and Hold" tubes (56 to 0). 2. Monthly total of blood tubes used in the ED decreased by 2.8% (11620 to 11300) 3. Attendance pending. Balancing measures: Monthly average volume of blood drawn decreased by 1.4L(2%) from 50.4L to 49.0L; LOS pending **Discussion/Impact:** A multi-pronged intervention resulted in a decrease in blood testing in the ED. We achieved the sub-aim of reducing targeted blood tests and are on track to achieve the overall aim of total lab reduction in the ED by April 2020. Final interventions to be implemented in the coming months include changes to the ED paper record and replacement of the paper add-on order process with an electronic ordering tool. Complete data will be available by April 2020. This intervention is scalable and has the potential to reduce costs and preventable harm to patients.

Keywords: choosing wisely, laboratory testing, quality improvement and patient safety

LO37

Reducing hemolysis of coagulation blood samples in the emergency department

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Background: Hemolysis of blood samples is the leading cause of specimen rejection from hospital laboratories. It contributes to delays in patient care and disposition decisions. Coagulation tests (prothrombin time/international normalized ratio [PT/INR] and activated partial thromboplastin time [aPTT]) are especially problematic for hemolysis in our academic hospital, with at least one sample rejected daily from the emergency department (ED). **Aim Statement:** We aimed to decrease the monthly rate of hemolyzed coagulation blood samples sent from the ED from a rate of 2.9% (53/1,857) to the best practice benchmark of less than 2% by September 1st, 2019. **Measures & Design:** Our outcome measure was the rate of hemolyzed coagulation blood samples. Our process measure was the rate of coagulation blood tests sent per 100 ED visits. Our balancing measure was the number of incident reports by clinicians when expected coagulation testing did not occur. We used monthly data for our Statistical Process Control (SPC) charts, as well as Chi square and Mann-Whitney U tests for our before-and-after evaluation. Using the Model for Improvement to develop our project's framework, we used direct observation, broad stakeholder engagement, and process mapping to identify root causes. We enlisted nursing champions to develop our Plan-Do-Study-Act (PDSA) cycles/interventions: 1) educating nurses on hemolysis and coagulation testing; 2) redesigning the peripheral intravenous and blood work supply carts to encourage best practice; and 3) removing PT/INR and aPTT from automatic inclusion in our electronic chest pain bloodwork panel. **Evaluation/Results:** The average rate of hemolysis remained unchanged from baseline (2.9%, $p = 0.83$). The average rate of coagulation testing sent per 100 ED visits decreased from 41.5 to 28.8 (absolute decrease 12.7 per 100, $p < 0.05$), avoiding $4,277 in monthly laboratory costs. The SPC chart of our process measure showed special cause variation with greater than eight points below the centerline. **Discussion/Impact:** Our project reduced coagulation testing, without changing hemolysis rates. Buy-in from frontline nurses was integral to the project's early success, prior to implementing our electronic approach – a solution ranked higher on the hierarchy of intervention effectiveness – to help sustainability. This resource stewardship project will now be spread to a nearby institution by utilizing similar approaches.

Keywords: laboratory testing, quality improvement and patient safety, resource stewardship

LO38

Reducing inappropriate urine culture testing in the emergency department

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Background: Urinary tract infections (UTI) are a common emergency department (ED) presentation. Urine cultures (UC) are frequently ordered to confirm the diagnosis, however, it can be challenging to differentiate between a true infection and asymptomatic bacteriuria (ASB) which does not generally benefit from antibiotics. This over-treatment of ASB leads to serious adverse side effects, growing antimicrobial resistance and increased healthcare costs. By reducing inappropriate ED urine culture testing, we can concomitantly avoid the false positives that contribute to this large-scale problem. **Aim Statement:** We aimed to reduce ED urine culture testing at Credit Valley Hospital, a large community hospital based in Mississauga, Ontario by 30%, from a baseline average of 97 cultures per 1000 ED visits in 2017, to 68 cultures per 1000 ED visits by year end 2019. **Measures & Design:** Multiple PDSA cycles were ran with our multi-disciplinary ED team. Our interventions to encourage rational urine culture testing are three-fold, including (1) medical directive optimization (removal of routine sending of UC), (2) individualized physician feedback and (3) physician education with introduction of a clinical decision aid. Our outcome measure is rate of UC per 1000 ED patient visits with a balance measure of rate of 30-day ED return visit of hospital admission for patients with a UTI. **Evaluation/Results:** Despite a parallel surge in ED volumes, we observed a significant decrease in urine culture testing, from an annual average of 97 cultures per 1000 ED visits to 60 cultures per 1000 ED visits in 2019 year-to-date. There was no increase in the rate of ED 30-day return visit or admission for UTI or a diagnostic equivalent. **Discussion/Impact:** Our multipronged approach effectively decreased the rate of UC testing during the study period. ED physicians provide higher quality care with judicious use of resources to guide diagnosis and management. Active ongoing interventions include our transition to a 2-step UC order protocol (uncoupling urinalysis with culture) using BD vacutainer urine collection products, which will allow for 48 hour storage of uncompromised urine. Further work will leverage our knowledge and experience with optimizing urine culture testing to other culture specimens.

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Keywords: asymptomatic bacteriuria, quality improvement and patient safety, urine cultures

LO39

Using an ambulatory zone to improve physician initial assessment times in a tertiary care hospital emergency department

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Background: Increasing Emergency Department (ED) stretcher occupancy with admitted patients at our tertiary care hospital has contributed to long Physician Initial Assessment (PIA) times. As of Oct 2019, median PIA was 2.3 hours and 90th percentile PIA was 5.3 hours, with a consequent 71/74 PIA ranking compared to all Ontario EDs. Ambulatory zone (AZ) models are more commonly used in community EDs compared to tertiary level EDs. An interdisciplinary team trialled an AZ model for five days in our ED to improve PIA times. **Aim Statement:** We sought to decrease the median PIA for patients in our ED during the AZ trial period as compared to days with similar occupancy and volume. **Measures & Design:** The AZ was reserved for patients who could walk from a chair to stretcher. In this zone, ED rooms with stretchers were for patient assessment only; when waiting for results or receiving treatment, patients were moved into chairs. We removed nursing assignment ratios to increase patient flow. Our outcome measure was the median PIA for all patients in our ED. Our balancing measure was the 90th percentile PIA, which could increase if we negatively impacted patients who require stretchers. The median and 90th percentile PIA during the AZ trial were compared to similar occupancy and volume days without the AZ. Additional measures included ED Length of Stay (LOS) for non-admitted patients, and patients who leave without being seen (LWBS). Clinicians and patients provided qualitative feedback through surveys. **Evaluation/Results:** The median PIA during the AZ trial was 1.5 hours, compared to 2.1 hours during control days. Our balancing measure, the 90th percentile PIA was 3.7 hours, compared to 5.0 during control days. A run chart revealed both median and 90th percentile PIA during the trial were at their lowest points over the past 18 months. The number of LWBS patients decreased during the trial; EDLOS did not change. The majority of patients, nurses, and physicians felt the trial could be implemented permanently. **Discussion/Impact:** Although our highly specialized tertiary care hospital faces unique challenges and high occupancy pressures, a community-hospital style AZ model was successful in improving PIA. Shorter PIA times can improve other quality metrics, such as timeliness of analgesia and antibiotics. We are working to optimize the model based on feedback before we cycle another trial. Our findings suggest that other tertiary care EDs should consider similar AZ models.

Keywords: patient flow, physician initial assessment, quality improvement and patient safety

LO40

Safe anticoagulation initiation for atrial fibrillation in the emergency department (the SAFE pathway)

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Background: Atrial fibrillation (AF) is a risk for stroke. The Canadian Cardiovascular Society advises patients who are CHADS65 positive should be started on oral anticoagulation (OAC). Our local emergency department (ED) review showed that only 16% of CHADS65 positive patients were started on OAC and that 2% of our patients were diagnosed with stroke within 90 days. We implemented a new pathway for initiation of OAC in the ED (the SAFE pathway). **Aim Statement:** We report the effectiveness and safety of the SAFE pathway for initiation of OAC in patients treated for AF in the ED. **Measures & Design:** A multidisciplinary group of physicians and pharmacist developed the SAFE pathway for patients who are discharged home from the ED with a diagnosis of AF. Step 1: contraindications to OAC, Step 2: CHADS65 score, Step 3: OAC dosing if indicated. The pathway triggers referral to AF clinic, family physician letter and follow up call from the ED pharmacist. Patients are followed for 90 days by a structured medical record review and a structured telephone interview. We record persistence with OAC, stroke, TIA, systemic arterial embolism and major bleeding (ISTH criteria). Patient outcomes are fed back to the treating ED physician. **Evaluation/Results:** The SAFE pathway was introduced in two EDs in June 2018. In total, 177 patients have had the pathway applied. The median age was 70 (interquartile range (IQR) 61-78), 48% male, median CHADS2 score 2 (IQR 0-2). 19/177 patients (11%) had a contraindication to initiating OAC. 122 patients (69%) had no contraindication to OAC and were CHADS65 positive. Of these 122 patients, 109 were given a prescription for OAC (96 the correct dose, 9 too high a dose and 4 too low a dose). 6 patients declined OAC and the physician did not want to start OAC for 7 patients. 73/122 were contacted by phone at 90 days, 15 could not be reached and 34 have not completed 90 days of follow up since their ED visit. Of the 73 who were reached by phone after 90 days, 65 were still taking an anticoagulant. To date, 1 patient who declined OAC (CHADS2 score of 2) had a stroke within 90 days and one patient prescribed OAC had a gastrointestinal bleed. **Discussion/Impact:** The SAFE pathway appears safe and effective although we continue to evaluate and improve the process.

Keywords: anticoagulation, atrial fibrillation, quality improvement and patient safety

LO41

The development of a standardized provincial massive hemorrhage protocol with a built-in continuous quality improvement framework

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Background: Massive hemorrhage protocols (MHPs) streamline the complex logistics required for prompt care of the bleeding patient, but their uptake has been variable and few regions have a system to measure outcomes from these events. **Aim Statement:** We aim to implement a standardized MHP with uniform quality improvement (QI) metrics to increase uptake of evidence-based MHPs across 150-hospitals in Ontario between 2017 and 2021. **Measures & Design:** We performed ongoing PDSA cycles; 1) stakeholder analysis by surveying the Ontario Regional Blood Coordinating Network (ORBCoN), 2) problem characterization and Ishikawa analysis for key QI metrics based on areas of MHP variability in 150 Ontario hospitals using a web-based survey, 3) creation of a consensus MHP via a modified Delphi process, 4) problem characterization at ORBCoN for

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