2023 Abstracts

Impact of Clinical Pharmacist Intervention on Medication Adherence HEDIS Star Measures within a Health System

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Background: The Centers for Medicare and Medicaid (CMS) aims to improve medication adherence by including adherence measures for common chronic disease states such as diabetes, hypertension, and hyperlipidemia. These measures are assessed using proportion of days covered (PDC) based on prescription claims. Medication adherence is achieved if a patient has a PDC of >80%. While there is literature available to support the success of pharmacists improving medication adherence in the community and managed-care pharmacy settings, there is minimal data to compare adherence in the setting of pharmacist-provider collaboration. The purpose of this study is to assess the impact of clinical pharmacists within a health system on medication adherence quality measures.

Methods: This study is a quality improvement project aimed to investigate the necessary process and procedure for the development of a successful pharmacist-led medication adherence program for patients on Medicare Advantage plans part of Indiana University Health. Patients were telephonically outreached if they were identified as having a PDC < 80% determined by reporting provided by the patientâ€™s health plan. The pharmacist identified barriers to medication adherence and performed necessary interventions. Data was collected based on the patientâ€™s fill history for identified non-adherent medications.

Results: Preliminary results suggest that common barriers to medication adherence are lack of disease understanding, need for a refill, and forgetting to refill medication. Common interventions to address these barriers were providing education, sending refills, and automatic refill enrollment. After the encounter with the pharmacist, approximately 71% of patients enrolled in Anthem and 40% of patients enrolled in United Healthcare filled their medication.

Conclusion: To be presented at the Great Lakes Pharmacy Resident Conference

Learning Objectives:

Recognize medications that are included in the HEDIS medication adherence measure
Define proportion of days covered (PDC)

Self Assessment Questions:

Which of the following medication would count toward the HEDIS medication adherence measure?
A. Amlodipine
B. Lisinopril
C. Ezetimibe
D. Insulin aspart

What measure is used to assess medication adherence to calculate the proportion of days covered (PDC)?
A. Number of pills in the household
B. Refills remaining on a prescription
C. Patient's attestation of adherence
D. Prescription claims

Q1 Answer: B Q2 Answer: D

Development and Implementation of an Anesthesia Automated Dispensing Cabinet (ADC) Inventory Optimization Process

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Purpose:
Specialized anesthesia ADCs used in procedural areas allow providers to quickly access perioperative medications with tailored functionality. While ADCs increase efficiency, limitations exist. Lack of stringent inventory controls can lead to stocking of infrequently used medications, increasing drug expense and risking patient safety if inventory expires in the ADC. Conversely, inadequate inventory can lead to frequent stock-outs of commonly used medications, resulting in delayed patient care and increased technician workload. The optimal process and metrics to assess and adjust inventory remain unknown. The purpose of this process improvement project was to create a systematic approach to identify and uniformly optimize anesthesia ADC inventory within a health system.

Methods:
This process improvement project utilized the FOCUS PDCA (Find, Organize, Clarify, Understand, Select, Plan, Do, Check, Act) methodology. In the FOCUS phase, the anecdotal reports of frequent stock-outs and expired medications determined the need for a process to optimize anesthesia ADC inventory. A multidisciplinary team of pharmacy and anesthesiology leaders convened to clarify the projectâ€™s scope. During the plan phase, objectives were identified: improve pharmacy technician efficiency by increasing vend/refill ratio of controlled medications and targeting a three-day supply of non-controlled medications; reduce low-use, non-emergent inventory; and describe cost savings following optimization. Pre-optimization data was collected for the pilot group. A formula to calculate optimal par levels and an algorithm to address low-use medications were created. The do phase included inventory changes to the pilot group. Collection and analysis of post-optimization data for the pilot group was completed in the check phase. In the act phase, the process was revised based on pilot group results, then implemented in the remaining ADCs across the health-system. The analysis and optimization process will recur on a quarterly basis.

Results/Conclusions: To be presented at the 2022 Great Lakes Pharmacy Residents Conference.
Learning Objectives:
Recognize the goals of optimizing automated dispensing cabinet inventory.
Identify metrics that assess the efficiency of the automated dispensing cabinet refill process.
Self Assessment Questions:
Which of the following is a goal of automated dispensing cabinet inventory optimization?
A. Decrease medication errors caused by unlabeled doses
B. Decrease scheduled refills of the ADC by pharmacy technicians
C. Improve tracking of medication use for appropriate billing
D. Improve workflow efficiency of pharmacy technicians refilling ADCs
Which of the following metrics is the most appropriate to assess efficiency of the anesthesia ADC refill process?
A. Stock-out percentage
B. Vend:refill ratio
C. Days since last used
D. Average daily use
Q1 Answer: D Q2 Answer: B

Evaluation of Adherence to a Health System's Guidelines for Treatment of Community Acquired Pneumonia
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including reduced in-hospital mortality, hospital length of stay, and broad-spectrum antibiotic days of therapy. However, studies have shown variability exists in the management of patients hospitalized with CAP, suggesting opportunities exist for increasing guideline adherence. The Center for Disease Control Core Elements for Hospital Antibiotic Stewardship Programs updated in 2019 recommended monitoring adherence to facility-specific treatment guidelines in order to identify opportunities for improvement. The purpose of this research project was to assess current prescribing practices at Norton Healthcare and compare them with established institutional guidelines for the treatment of CAP to identify opportunities to promote antimicrobial stewardship.

Methods: This was a multicenter, retrospective cohort study of adult patients hospitalized for CAP in 2021. Patients were included if they had an ICD-10 code for pneumonia at discharge and received at least 3 days of antibiotics for pneumonia starting on day 1 of admission. Patients were excluded if they were severely immunocompromised, pregnant, incarcerated, transferred from another hospital, or had an acute, extra-pulmonary, bacterial infection, a complicated parapneumonic pleural effusion or lung abscess, or cystic fibrosis. The primary outcome was a composite of percentage adherence to institutional pneumonia guidelines for the treatment of CAP including initial antibiotic selection in emergency department, initial antibiotic selection upon admission, IV to PO conversion, and total length of therapy. Secondary outcomes included individual percentage adherence to each of the previously stated criteria as well as a description and comparison of baseline patient characteristics overall and based on adherence rate.

Results/Conclusions: To be presented at the 2023 Great Lakes Pharmacy Residency Conference.

Learning Objectives:
Recognize the benefits of guideline adherence for the management of community acquired pneumonia
Identify when empiric MRSA and P. aeruginosa coverage for community acquired pneumonia is recommended by guidelines
Self Assessment Questions:
Which of the following is associated with guideline concordant therapy for patients hospitalized with CAP?
A. Reduced mortality
B. Reduced hospital length of stay
C. Reduced broad-spectrum antibiotic days of therapy
D. All of the above
A 65-year-old female with NKDA is admitted to the floor for non-severe CAP. The patient was hospitalized and received IV antibiotics 2 months ago, but has no other risk factors for resistant organisms. According to the 2019 IDSA guidelines for CAP, which of the following is the best empiric treatment option for this patient?
A. Ampicillin-sulbactam + levofloxacin
B. Ampicillin-sulbactam + azithromycin
C. Piperacillin-tazobactam + tobramycin + vancomycin
D. Cefepime + tobramycin + vancomycin
Q1 Answer: D Q2 Answer: B

Pharmacist-Led Culture Callback Protocol in ED
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Purpose: To assess the impact of a pharmacist-led antimicrobial stewardship initiative to review positive microbiological test results from patients discharged from the emergency department (ED) at a single center.

Methods: A retrospective review of patient charts from June to July 2022 was performed to collect baseline data. A pharmacist protocol will be implemented February 2023. Time to result review, number of indicated interventions completed, and readmission rates will be measured to compare ED nurse facilitated physician review to pharmacist-led review.

Results/Conclusion: Background data review revealed deficiencies in timeliness of culture review and gaps in patient care as it relates to culture follow up. With the initiation of the protocol, the pharmacy antimicrobial stewardship team within the emergency department is able to assist with culture review for discharged patients and the selection of antibiotics. Final results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.
Learning Objectives:
Identify the major differences regarding culture review timeliness with the ED physician-led protocol compared to the pharmacist-led protocol.
Discuss how implementing the pharmacist-led culture callback protocol optimized patient care.
Self Assessment Questions:
What was a major finding when reviewing background data with the current ED physician-led protocol?
A. No patients were readmitted
B. Over half of the culture results were not reviewed within 48 hours of being available
C. Patients that required antimicrobial adjustments received the changes to their regimen
D. Less than half of the patients required changes to their empiric antibiotics
How does implementing a pharmacist-led protocol optimize this culture callback process?
A. Pharmacists now can decide on what antibiotics the patient should be sent home on
B. Pharmacists can remind physicians to look at the nurse communication regarding culture results to speed up the process
C. Pharmacists can make changes to antibiotics when it is warranted without contacting the physician
D. Pharmacists are now consulted for antibiotic dosing for patients before leaving the emergency department
Q1 Answer: B Q2 Answer: A

Evaluation and optimization of a therapeutic enoxaparin dosing and monitoring protocol in high-risk populations
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body weight, evidence and recommendations for anti-factor Xa monitoring are not conclusive. To assist with clinical decision-making, Norton Healthcare (NHC) developed a Therapeutic Enoxaparin Anti-Factor Xa Monitoring and Dose Adjustment Protocol to allow pharmacists to order and adjust enoxaparin doses based on anti-factor Xa levels in defined high-risk patient populations. Based on updated literature and concerns regarding pharmacist resource utilization, this process improvement project aims to identify opportunities to optimize safety and patient inclusion within the protocol.
Methods: The Define-Measure-Analyze-Improve-Control (DMAIC) methodology was used for this process improvement study. The define phase outlined the high-risk monitoring criteria, bleeding and thrombosis definitions. The measure phase consisted of a retrospective chart review of 102 patients receiving therapeutic enoxaparin with an anti-factor Xa level assessed. Patients included for review were â‰¥18 years old, hospitalized at NHC adult hospitals, and met one of the four high-risk criteria defined as weight â‰¤ 45 kg, BMI â‰¥ 45 kg/m2, receiving renal replacement therapy, or age â‰¥ 65 years with CrCl < 60 mL/min. In the analyze phase, the percentage of supra-therapeutic levels were used to evaluate appropriateness of current monitoring criteria. Protocol safety was assessed by evaluating the outcomes of enoxaparin dose adjustments. In the improve phase, refinement or expansion of protocol monitoring criteria and assessment of resource utilization will be completed with the goal of enhancing capture of patients most likely to have supratherapeutic levels or bleeding events. In the control phase, approved protocol improvements will be implemented and deemed successful if resource utilization is estimated to decrease and safety is maintained.
Results/Conclusions: To be presented at the 2023 Great Lakes Pharmacy Resident Conference.
Learning Objectives:
Select the rationale for monitoring anti-factor Xa levels in specific populations
Identify a patient at risk for having supratherapeutic anti-factor Xa levels while receiving treatment dose enoxaparin
Self Assessment Questions:
Which of the following is the primary rationale for monitoring anti-factor Xa levels in high-risk patient populations?
A. Achieve therapeutic anti-factor Xa levels
B. Aid in clinical decision making
C. Prevent further thrombosis
D. Eliminate risk of bleeding
Which of the following patients is most at risk for supra-therapeutic anti-factor Xa levels while receiving treatment dose enoxaparin?
A. 64-year-old male (72 kg, CrCl 64 mL/min)
B. 19-year-old post-partum female (BMI 29 kg/m2, CrCl 82 mL/min)
C. 69-year-old female (44 kg, CrCl 37 mL/min)
D. 45-year-old male with CKD (72 kg, CrCl 59 mL/min)
Q1 Answer: B Q2 Answer: C

Comparison of Traditional Three-Day Oral Sotalol Loading to a Single-Day Intravenous Sotalol Initiation Protocol: An Observational Study

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as a loading dose for initiation in patients with AF. The IV administration shortens the time to achieve steady-state to just one day, in comparison to a traditional three-day oral sotalol load.
Objective: This study aims to compare the efficacy and safety of initiating a three-day oral sotalol load to a single-day IV sotalol dosing protocol in patients with AF.
Methods: A retrospective study that included patients initiated with either IV or oral sotalol between January 2018 and August 2022 at a single academic medical center. The primary endpoint was maintenance of sinus rhythm (SR) at discharge and 30 days post initiation. The secondary endpoints included incidence of QTc prolongation >500ms, heart rate <40bpm, ventricular arrhythmias, and discontinuation of sotalol after initiation.

Results: A total of 95 patients (64.2% male) underwent a single-day IV sotalol loading protocol and 96 patients (67.7% male) received a three-day oral sotalol initiation. SR was maintained at discharge in 81.1% and 83.3% (p=0.4) and at 30-days in 59% and 66.7% (p=0.141) in the IV and oral groups, respectively. A QTc >500ms was observed at discharge in 6.6% and 9.9% (p=0.591) and at 30-days in 10.3% and 12.5% (p=0.798) in the IV and oral group, respectively. Discontinuation of sotalol during initiation occurred in 4 patients (4.2%) in the IV group and 7 patients (7.29%) in the oral group, due to adverse events such as bradycardia, QTc prolongation, and failure to maintain SR (p=0.537).
Conclusion: Despite more risk factors for treatment failure, AF patients initiated on sotalol therapy with IV loading achieved similar maintenance of SR at discharge and 30 days compared to oral loading with no difference in adverse events.
Learning Objectives:
Define the risk factors for atrial fibrillation
List the major concerns when initiating sotalol
Self Assessment Questions:
What are risk factors that would indicate a patient is more likely to have persistent atrial fibrillation?
A. Advanced Age
B. Obesity

C. Alcohol Consumption
D. All of the Above
What are major concerns when initiating sotalol?
A. Heart Rate
B. Liver Dysfunction
C. QTc Prolongation
D. Answer A & C
Q1 Answer: D Q2 Answer: D

Assessing Internal Voluntary Error Report Outcomes Following Oncology Ambulatory Note Implementation

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Background:
Chemotherapy is a high-risk class of medications that account for 1 - 3% of medication errors in all oncology patients in many institutions. Computerized-physician order entry (CPOE) systems can reduce errors associated with prescriber order entry. However, overreliance on CPOE can potentiate other forms of end-user errors. American Society of Health-System Pharmacists recommends the use of a checklist to act as extra checkpoints to reevaluate regimens. PRONTO is a standardized checklist for chemotherapy published by the Journal of Oncology Pharmacy Practice that had been previously utilized by pharmacists in variety of practice settings. The six elements of PRONTO include patient, regimen, organ function, numbers, toxicities, and order verification.

Purpose:
The primary objective is to evaluate the effectiveness of the oncology ambulatory note by assessing the rate of pharmacy-reported chemotherapy or related errors reporting post-implementation. The oncology ambulatory note utilizes the PRONTO concept. Errors are categorized using the National Coordinating Council for Medication Error Reporting and Prevention (NCC MERP) Category Index. One secondary objective is to characterize the rate of reporting across NCC MERP categories.

Methods:
The organizationâ€™s institutional review board approved this retrospective quality improvement project. Internal voluntary error report data of outpatient oncology infusion centers were collected between June 13th, 2022, and December 13th, 2022. The data were divided into 90 days pre- and post-implementation periods, with the implementation date on September 13th, 2022. For the primary objective, the rate of pharmacy-specific reports was calculated based on the total number of reported NCC MERP categorized error reports. The difference in the rate of reporting was assessed pre- and post-implementation. For the secondary objectives, the pharmacy-specific reports will be divided into three categories: A-B; I ; C-H. The nodes of errors will also be assessed.

Results and Conclusions will be presented at The Great Lakes Pharmacy Residency Conference.

Learning Objectives:
Discuss The current state with Computerized-Provider Order Entry (CPOE) in chemotherapy and related therapies
Describe The outcome of internal voluntary error reporting following implementation of the PRONTO note in outpatient oncology infusion centers

Self Assessment Questions:
Which of the following is NOT part of the definition of a sentinel event?
A. Patient safety event (not primarily related to the natural course of the patientâ€™s illness or underlying condition) that reaches a patient and results in death
B. Patient safety event (not primarily related to the natural course of the patientâ€™s illness or underlying condition) that reaches a patient and results in permanent harm
C. Patient safety event (not primarily related to the natural course of the patientâ€™s illness or underlying condition) that reaches a patient and results in severe temporary harm
D. Patient safety event (not primarily related to the natural course of the patientâ€™s illness or underlying condition) that occurred but did not reach the patient
Which NCC MERP category (ies) may represent good-catches/near-misses type of medication errors?
A. Categories A-B
B. Categories C-H
C. Categories A-H
D. Category I
Q1 Answer: D Q2 Answer: A

Justification of a Pharmacist-led Collaborative Hypertension Management Service in a Health-System Owned Primary Care Clinic

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Purpose: The American College of Cardiology and American Heart Association reported 47.3 percent of US adults had hypertension as of 2017. Of the patients who are being treated with medication for their hypertension, 59.5 percent are not at their blood pressure goal of less than 140/90 mmHg. The purpose of this study is to evaluate the impact of a pharmacist-led hypertension management service on blood pressure control.

Methods: A retrospective chart review was completed for patients managed by a pharmacist for their hypertension at a single primary care clinic. The review includes patients aged 18-85 with a hypertension appointment with a pharmacist between October 1st 2021 and September 30th 2022. The primary objective is to determine the percentage of patients whose most recent blood pressure is less than 140/90 mmHg after an elevated blood pressure reading. Data was compared to physician Healthcare Effectiveness Data and Information Set scores to determine the impact of care type on patients reaching their blood pressure goal. Those with end-stage renal disease, pregnant patients, patients age 81 and older with frailty and 66-80 with frailty and advanced illness were excluded.

Results: 275 patients were reviewed and 6 were excluded from chart review. Of the 269 patients reviewed, 62.83% had a blood pressure within goal at their most recent office visit after seeing a pharmacist for hypertension management. 87.73% had at least one in goal blood pressure after seeing a pharmacist for hypertension management.

Conclusions: Nearly 88% of patients seen by a pharmacist achieved their goal during the time they were being seen by the pharmacist. The percentage of patients at goal during their most recent office visit was significant lower. Based on this discrepancy in data, additional follow up after discharge from hypertension management is warranted to improve scores.

Learning Objectives:

Discuss the current workflow and outcomes of hypertension management by pharmacists
Identify areas of improvement for the service and implement a standard follow up workflow

Self Assessment Questions:

Which patient should be screened for white coat hypertension?
A. A patient with an at goal in office BP and no home readings
B. A patient with an above goal in office BP and above goal home BP on a validated cuff
C. A patient with an at goal in office BP and above goal home BP on a validated cuff
D. A patient with a slightly above goal in office BP and no home readings

Which blood pressure goal is used by NCQA to score providers?
A. <120/80 mmHg
B. <130/80 mmHg
C. <140/90 mmHg
D. <160/90 mmHg

Q1 Answer: D Q2 Answer: C

Colchicine Safety and Effectiveness for Pericarditis in Patients with Severe Chronic Kidney Disease

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cardiac filling or tamponade. First-line medications include NSAIDS. Corticosteroids, colchicine, and immunosuppressants are other treatment options. Interest has gained for the use of colchicine adjunctively for initial pericarditis treatment. Colchicine has been shown to reduce symptom persistence at 72 hours, recurrence rate, and number of recurrences. The trials assessing colchicine excluded patients with a serum creatinine of greater than 2.5mg/dL. A case-control study of 22 hemodialysis patients treated with colchicine for various conditions, demonstrated that colchicine was well tolerated in maintenance hemodialysis patients receiving a total daily dose of 1.5 mg. Clinically, colchicine is used in kidney disease in small doses for a short duration. There is minimal data available in current literature on colchicine dosing, monitoring, adverse events, and tolerability in patients with severe chronic kidney disease.

Statement of Purpose: To provide additional information on colchicine safety and effectiveness for pericarditis in patients with severe chronic kidney disease and give guidance on safe dosing and monitoring.

Methods: This study is a single center retrospective case-series with data collected from January 2016 â€“ October 2022. The study will include patients with a new inpatient diagnosis of acute pericarditis and severe chronic kidney disease, defined as a creatinine clearance less than 30mL/min, receiving colchicine for pericarditis. Patientsâ€™ records will be collected for 12 months after their index pericarditis event. Data will be collected regarding resolution of index pericarditis and development of toxicity related to colchicine use, recurrence rate and readmission rate of pericarditis, therapy change and reason for colchicine discontinuation, time to resolution of symptoms, time to recurrence, all-cause mortality, and drug-drug interactions.

Data is currently being collected and results will be presented at the conference.

Learning Objectives:
Describe colchicine safety and effectiveness in patients with new acute pericarditis and severe chronic kidney disease
Describe how Trinity Health St. Joseph Mercy has been using colchicine for pericarditis in patients with severe chronic kidney disease
Self Assessment Questions:
Which of the following is true regarding colchicine?
A. It has a narrow therapeutic index in patients with kidney disease
B. It can cause significant GI intolerance
C. Intolerances typically occur rapidly, within the first 24 hours
D. All of the above
What is the typical duration of colchicine for pericarditis?
A. 8 months
B. 3 months
C. 1 month
D. 3 weeks
Q1 Answer: D Q2 Answer: B

Impact of Darbepoetin Use in Patients Refusing Blood Productsâ€¯
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Purpose: Over 8.6 million people worldwide identify as a Jehovah's Witness, a denomination of Christianity that often abstains from products derived from blood due to religious beliefs. This includes red blood cells, platelets, white blood cells, and unfractionated plasma. Following a traumatic injury, blood loss and innate inflammatory processes have been associated with secondary complications including anemia, creating decreased oxygen delivery to tissues and organs within the body. Additionally, surgical procedures can result in significant blood loss and anemia, creating additional complexities in the care of people who decline blood products and the need for alternative methods to blood transfusions to be considered. Current literature only investigates the use of epoetin alfa, an albumin-containing erythropoiesis stimulating agent (ESA), to treat anemia in patients who decline blood products. This may be problematic as albumin is a product derived from blood. Darbepoetin alfa, an albumin-free alternative to epoetin alfa, has been the selected formulary ESA at our institution since 2016 for this patient population. The primary objective of this study is to compare whether darbepoetin alfa use or no darbepoetin alfa use improves anemia and outcomes in trauma or surgical patients who refuse blood products.

Methods: This single center, retrospective, cohort study included patients greater than 18 years of age, admitted to a trauma, emergency general surgery, or surgery team with anemia (hemoglobin < 7 g/dL) who declined blood products. Data was collected from the time of admission to the time of discharge from August 1, 2010 to August 1, 2022. Patients were excluded if they were pregnant at time of admission, received darbepoetin alfa for indications outside of trauma- or surgery-related anemia, received a blood transfusion, or received epoetin alfa.

Results and Conclusions: Preliminary results and conclusions will be presented at Great Lakes Pharmacy Residency Conference.
Learning Objectives:
Review the mechanism of anemia in trauma and determine treatment strategies.
Identify the potential benefits of darbepoetin alfa over epoetin alfa in patients who refuse blood products.
Self Assessment Questions:
Which clinical marker would you expect to be elevated in trauma?
A. Inflammatory markers (IL-6, TNF-alpha, IL-1)
B. Erythropoietin
C. Hemoglobin
D. Iron
Why might darbepoetin alfa be beneficial for patients who refuse blood products?
A. It stimulates erythropoiesis production
B. It is an albumin-free productÂ
C. It provides a unique mechanism of action to aid in multimodal treatment strategies
D. All of the above
Q1 Answer: A Q2 Answer: D

Antibiotic Duration in Patients with a Planned Relaparotomy for Intra-Abdominal Infection
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Purpose: Intra-abdominal infection (IAI) is a leading cause of sepsis and a common cause of morbidity and mortality. The basic components of IAI management includes resuscitation, obtaining source control, removal of infected material, and administration of antibiotics. Antimicrobial therapy for the management of IAI continues to evolve based on available published literature. However, the appropriate duration of therapy remains unclear, which has created variations in clinical practice. Based on the results of the Study to Optimize Peritoneal Infection Therapy (STOP-IT) trial in 2015, many clinicians have adopted a short course antibiotic strategy in patients who have undergone a successful source control procedure. This trial provided evidence to support a new treatment approach for IAIs, but it excluded a large population of higher risk patients requiring repeat laparotomy. Therefore, this study aimed to determine the short- and long-term recurrent infection risk in patients admitted for IAI and planned relaparotomy.
Methods: Single-center, retrospective, cohort study of adult patients admitted to a quaternary medical center between January 1, 2016, and August 1, 2022, with an intra-abdominal infection requiring more than one laparotomy procedure. The primary outcome was intra-abdominal infection recurrence within 30 days. Secondary outcomes included re-admission for procedural intervention within 90 days, total antibiotic duration, inpatient mortality, hospital and ICU length of stay, and surgical site infections. Source control was determined by an institutional surgeon investigator. Demographics, surgical practices, antibiotic practices, and clinical outcomes were compared based on the duration of antibiotic agents, either 4 Â± 1 day or greater than 5 days of therapy after source control.
Results:â€¯â€¯ Results will be presented at the conference.
Conclusions: Conclusions will be presented at the conference.
Learning Objectives:
Discuss current literature surrounding antimicrobial therapy in patients requiring exploratory laparotomy for intra-abdominal infections
Translate current data to optimize treatment of intra-abdominal infections in clinical practice
Self Assessment Questions:
What was the number of days of antibiotic therapy designated as â€¯short-course' in the STOP-IT trial?
A. 4 days
B. 5 days
C. 8 days
D. 10 days
What was the primary outcome of this study?
A. Infection recurrence within 30 days
B. Inpatient mortality
C. Surgical site infection
D. Re-admission for procedural intervention
Q1 Answer: A Q2 Answer: A

An evaluation of a standardized obstetrics insulin drip protocol and order set
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Purpose: As the prevalence of diabetes increases in the general population, there is an increasing number of pregnancies affected by both pregestational and gestational diabetes. Because glucose diffuses across the placenta, uncontrolled maternal hyperglycemia is associated with negative neonatal outcomes. Although not the only complication, resultant fetal hyperinsulinemia is of particular concern due to the possibility of profound neonatal hypoglycemia and increased care requirements. Because of this, antenatal maternal glycemic control is crucial. The present study addresses two time points in which the challenge of glycemic control increases, including antenatal corticosteroid use and during labor and delivery. Based on the available literature and guidelines by the American College of Obstetricians and Gynecologists and the American Diabetes Association, an obstetrics specific IV insulin protocol was implemented at our center. The primary purpose of the study is to determine if this implementation improved time spent in goal glucose range of 70 â€“ 110mg/dL.

Methods: This is a retrospective, single-center, pre-post study between January 2019 and May 2022 including patients between 16 and 50 years of age, assigned female at birth, pregnant at admission with a diabetes diagnosis who required an IV insulin (IVI) drip either in conjunction with antenatal corticosteroids or during labor and delivery. The standardized obstetrics IVI protocol was implemented on January 1, 2022. Prior to this, a general adult protocol was utilized and titrated based on provider discretion. The primary outcome of the study is the percent time spent in the goal glucose range. Additional outcomes include instances of maternal hypo- or hyperglycemia, neonatal hypoglycemia, and NICU admissions and length of stay.

Results/Conclusion: To be presented at Great Lakes Pharmacy Resident Conference
Learning Objectives:
Describe the relationship between maternal glycemic control and neonatal outcomes
Recognize differences in glycemic goals between obstetric and non-obstetric patients with diabetes and determine how this affects treatment
Self Assessment Questions:
Which of the following is a potential negative outcome due to uncontrolled maternal hyperglycemia?
A. Microsomia

B. Fetal hyperinsulinemia
C. Neonatal hyperglycemia
D. Prolonged labor
How do standardized obstetric IVI protocols often differ from non-obstetric specific protocols?
A. Rate of infusion
B. Type of insulin used
C. Blood glucose goals
D. Hypoglycemia treatment
Q1 Answer: B Q2 Answer: C

Epidural-Induced Hypotension During Labor and Delivery: Incidence and Risk Factors

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to varying definitions of hypotension across institutions and guidelines, leaving questions regarding the true incidence. Risk factors for this hypotension are not well known. In addition, few studies have evaluated the incidence of hypotension and associated risk factors in both vaginal and cesarean deliveries. More research is needed to identify these risk factors and assist providers in mitigating hypotension prior to delivery. Therefore, this study aims to determine the incidence and risk factors for hypotension after the administration of an epidural prior to delivery.

Purpose: To determine the incidence and risk factors for post-epidural hypotension in laboring mothers prior to delivery.

Methods: This retrospective chart review was conducted at Baptist Health Louisville in Louisville, Kentucky. For this study, hypotension was defined as systolic blood pressure < 100 mmHg or > 20% decrease from baseline 90 minutes after epidural administration. Pregnant women aged 18 or older who received epidural analgesia prior to delivery were included. Those who experienced post-partum hemorrhage, required general anesthesia, or were hypotensive at baseline on admission, with a systolic blood pressure < 100 mmHg, were excluded. The primary endpoint of this study was the incidence of hypotension. The secondary endpoint of this study was to determine the risk factors associated with hypotension after epidural placement. Patient charts were reviewed for the following information: age, race, height, weight, heart rate, blood pressure, mode of delivery, hypertension or hypotension prior to admission, fluid bolus received, epidural analgesic used, other medications that induce hypotension, and receipt of ephedrine.

Results/Conclusions: Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Review incidence and causes of epidural-induced hypotension
Discuss risk factors for epidural-induced hypotension

Self Assessment Questions:

What is the most common definition of hypotension in laboring mothers?
A. < 90 mmHg or < 70% of baseline
B. < 100 mmHg or < 80% of baseline
C. < 100 mmHg
D. < 100 mmHg or < 70% of baseline
Which of the following is not a risk factor for hypotension post-epidural placement?
A. Gravidity of 1
B. Age 40
C. BMI 35
D. Baseline SBP of 110 mmHg
Q1 Answer: B Q2 Answer: A

Characterizing Redundancy in Pharmacy Residency Research Projects

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Purpose: Each year, many residents across the country research similar popular topics to meet the requirements of the American Society of Health-System Pharmacists (ASHP) residency standards related to research and project management. Several investigators have evaluated residency research project publication rates (which remain low nationally), but redundancy, or duplication of resident research projects, has not been evaluated. The primary objective of this study is to characterize the incidence of redundancy within pharmacy residency research projects.

Methods: This was a retrospective cohort analysis of project abstracts accepted to various pharmacy residency regional conferences in the United States. Information on abstracts submitted to regional residency conferences around the country was requested from residency conference coordinators for conferences held from 2017-2020. Information requested included abstract title, abstract, program type, program year, institution name, resident name, and resident email address. Each abstract was placed in a pharmacy domain. The number of abstracts from each domain was determined.â€¯The categorized data for each year was then further evaluated to identify clinical categories within the year. For each year, there were roughly fifteen prominent clinical categories. Topics were labeled as redundant if at least ten projects fell into the same clinical category. Descriptive statistics were used to quantify the incidence of redundancy each year. â€¯

Results and Conclusion: Over 3,000 abstracts have been included. Data analysis is ongoing. Preliminary results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe a framework for characterizing redundancy in pharmacy resident research projects.

Define the sample sizes of redundant research projects.

Self Assessment Questions:

What is a common factor that leads to resident projects not being published?

A. Low sample size

B. Multicenter research

C. Resident research committee

D. Use of a statistician

What percentage of pharmacy residency research projects get published?

A. 25-30%

B. 35-40%

C. 40-45%

D. 55-60%

Q1 Answer: A Q2 Answer: A

An Evaluation of the Clinical Significance of Coadministering Moderate to Strong Cytochrome P450 Enzyme Inhibitors with Doxorubicin

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Purpose: Many traditional chemotherapy agents do not have specific targets and due to their broad spectrum of action can cause widespread side effects. Drug interactions can influence antineoplastic drug concentrations. Reduced drug levels may lead to treatment failure, while increased drug levels may increase the frequency or severity of drug toxicity. Cytochrome P450 (CYP) enzyme-inhibitors are a common source of such interactions. Doxorubicin is contraindicated with CYP2D6 and CYP3A4 inhibitors. However, minimal clinical data on these interactions exists which creates a challenge in making informed decisions. The goal of this study is to assess the incidence of toxicity secondary to doxorubicin treatment with or without concomitant administration of CYP enzyme inhibitors.

Methods: This is a single-center, retrospective study of adult female patients with breast cancer treated at the Brown Cancer Center between October 1, 2017 and September 1, 2022. Patients included in this study received doxorubicin and cyclophosphamide (AC) treatment for breast cancer. Patients will be excluded if they previously received doxorubicin for any other indication. Relevant patient data, including laboratory measures and medication lists, will be obtained from the electronic medical record. Patients will be divided into three arms: no moderate or strong CYP enzyme interactions, moderate or strong CYP2D6 enzyme inhibitor interactions, and moderate or strong CYP3A4 enzyme inhibitor interactions. The primary endpoint will be a composite of development of grade 3 or 4 toxicity (as defined by the Common Terminology Criteria for Adverse Events classification), incidence of hospitalization, treatment delay, or dose reduction. Secondary outcomes will include development of grade 3 of 4 toxicity, incidence of hospitalization, treatment delay, dose reduction and time to toxicity.

Results: Data collection and analysis are on-going. Results and conclusions will be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recall significant toxicities of doxorubicin

Identify common cytochrome P450 inhibitors which could potentially result in increased risk of doxorubicin toxicity

Self Assessment Questions:

1. Which of the following is a boxed warning toxicity of doxorubicin?

A. Palmar-plantar erythrodysesthesia
B. Cardiomyopathy
C. Hepatoxicity
D. Pneumonitis

2. Which of the following drugs interacts with doxorubicin and is correctly matched with the cytochrome P450 isoform it inhibits?
A. Terbinafine â€“ CYP3A4
B. Clarithromycin â€“ CYP2D6
C. Paroxetine CYP3A4
D. Bupropion â€“ CYP2D6

Q1 Answer: B Q2 Answer: D

Continuous Infusion Versus Intermittent Bolus on Blood Pressure Variablity in Acute Spontaneous Intracerebral Hemorrhage

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Purpose: Intracerebral hemorrhage (ICH) continues to be associated with high morbidity and mortality. Medical management post-acute spontaneous ICH is limited to surgical intervention, coagulopathy correction, and blood pressure control. An acute hypertensive response is common in ICH and prompt blood pressure control is imperative for patient outcomes and reducing hematoma growth. INTERACT-2 and ATACH-2 were published in 2013 and 2016 respectively and looked to evaluate blood pressure targets in patients with acute spontaneous ICH and its effect on major death or disability on the Modified Rankin Scale (mRS). Both did not find statistical significance with lower blood pressure goals on their primary outcome but did suggest patients may have better functional outcomes. In post hoc analyses of both studies, it was determined that high variability in systolic blood pressure was associated with worse utility-weighted mRS and unfavorable neurological outcomes. The INTERACT-2 trial primarily used intermittently dosed antihypertensive agents whereas ATACH-2 used a continuous infusion antihypertensive. There is currently no evidence or guideline recommendation for a preferred blood pressure management strategy that both reduces blood pressure into goal range, while also minimizing variability. This study is a secondary analysis of INTERACT-2 and ATACH-2 data to compare intermittent bolus dosing to a continuous infusion and their effect on blood pressure variability.

Methods: Both INTERACT-2 and ATACH-2 have data sharing agreements. Patients from both studies will be split into treatment groups, intermittent bolus dosing versus continuous infusion, that have similar blood pressure goals. Primary outcome of blood pressure variability will be analyzed by comparing standard deviations and percent time outside of blood pressure goal between the treatment modalities. The secondary outcome of this study will compare both treatments and their effect on mRS to evaluate neurologic functionality.

Results/Conclusion: Will be presented at the Great Lakes Pharmacy Resident Conference

Learning Objectives:

Identify a blood pressure goal for patients with acute spontaneous intracerebral hemorrhage
Describe the impact blood pressure variability has on patient outcomes

Self Assessment Questions:

Per the AHA/ASA guidelines, what is the blood pressure goal in patients with mild to moderate spontaneous ICH?
A. < 130 mmHg
B. 130-150 mm Hg with a goal of 140 mm Hg
C. 150-170 mm Hg with a goal of 160 mm Hg
D. > 170 mm Hg

In addition to maintaining patients with acute spontaneous intracerebral hemorrhage within their blood pressure goal, it is important to...
A. Reduce large swings in blood pressure
B. Keep blood pressure at the higher end of the range
C. Keep blood pressure at the lower end of the range
D. Nothing. If blood pressures are in the range, you're good.

Q1 Answer: B Q2 Answer: A

Evaluation of fluid status in critically ill patients with sepsis

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Purpose:
The Surviving Sepsis Campaign has made changes to the fluid recommendations in the most recent version of the sepsis guidelines. These changes included suggesting balanced crystalloids over 0.9% sodium chloride and reducing the strength of recommendation for the 30 mL/kg bolus from strong to weak. Adequate fluid resuscitation is essential for the restoration of cardiac output, systemic blood pressure and renal perfusion in critically ill patients with septic shock. Large volume fluid resuscitation is a cornerstone treatment for sepsis; therefore, fluid overload recognition and correction is vital to preventing further complications. Accumulating evidence has established a correlation between fluid overload and worsening AKI progression, prolonging mechanical ventilation, and mortality. Recent studies found potential benefit with implementation of de-resuscitation protocols that are potentially effective at reducing fluid overload. The purpose of this study is to determine the fluid status of sepsis patients in the ICU after initial fluid resuscitation and assess if there is an opportunity for implementing a de-resuscitation protocol.
Methods:
This retrospective medical chart review was conducted from December 1, 2021 to August, 1 2022 at four community hospital ICUs located in Louisville, KY. The study included patients admitted to the ICU from the ER with a primary diagnosis of sepsis or septic shock that received resuscitation fluids within 72 hours of admission. Exclusions included age less than 18 years, comfort measures ordered prior to 72 hours after shock resolution, death within 72 hours of admission, pregnancy, imprisonment, rhabdomyolysis, diabetic ketoacidosis, hyperosmotic hyperglycemia syndrome, and inadequate intake and output (I&O) reporting. The primary outcome is net fluid balance at 72 hours following shock resolution or ICU discharge. Secondary outcomes included incidence of fluid overload, AKI, hyperchloremia, and net fluid balance at pre-specified times.
Results and Conclusions:
To be presented at the 2023 Great Lakes Pharmacy Resident Conference.
Learning Objectives:
Identify the current recommendations from the Surviving Sepsis Campaign for fluid choice and volume for initial resuscitation in sepsis patients
Recognize patient outcomes that are associated with fluid overload in sepsis patients
Self Assessment Questions:
1.Which fluid recommendation is the best option based on the Surviving Sepsis Campaign guidelines for resuscitation?
A. Normal Saline 30mL/kg (ABW)
B. Lactated Ringerâ€™s 20 mL/kg (ABW)
C. Lactated Ringerâ€™s 30 mL/kg (IBW)
D. Normal Saline 20 mL/kg (IBW)
Fluid overload in sepsis patients is associated with which of the following outcomes?
A. Reduced mechanical ventilation
B. Decreased acute kidney injury
C. Increased mortality
D. Discontinuation of renal replacement therapy
Q1 Answer: C Q2 Answer: C

Battle of Bugs and Babies: Antibiotic Selection and Dosing in Neonatal Sepsis
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Neonatal sepsis is the leading cause of infant mortality worldwide. There are an estimated 1.3 million incidents of neonatal sepsis each year worldwide, with a mortality of up to 17% in patients admitted to the hospital. Though guidelines exist for the treatment of both early-onset and late-onset neonatal sepsis, standardized medication regimens have not been well established. This lack of standardization has required individual hospitals and healthcare systems to develop institution-specific guidelines to manage their patients. UW Health does not currently have a standardized approach for treating neonatal sepsis, providing an opportunity to reduce variability in antibiotic utilization and management. The purpose of this study is to standardize empiric antibiotic selection and dosing for early-onset sepsis, hospital-acquired late-onset sepsis, and community-acquired late-onset sepsis at UW Health.
Methods:
This project ultimately intends to create an evidence-based consensus care guideline through following multi-faceted approach: surveying neonatal sepsis guidelines from various institutions, evaluating bacterial surveillance reports, evaluating the UW Health NICU and other local antibiograms, comparing the gathered information to antibiotic choices recommended by the Academy of American Pediatrics, World Health Organization, and Academy of American Family Practice, and incorporating recommendations from high-quality primary literature. Immediate anticipated results are creation of a new UW Health order panel for neonatal sepsis and subsequently stronger recommendations for empiric antibiotic selection and dosing. This will ultimately result in an updated order panel within the electronic health record, and eventually an institution-specific consensus care guideline for the management of neonatal sepsis.
Preliminary Results:
Preliminary results include literature from a comprehensive literature search that has been graded using standardized GRADE criteria and a new NICU antibiogram. Future steps include creating a UW Health Epic HealthLink order panel and Consensus Care Guideline.
Results/Conclusions: Results and conclusions will be presented at the 2023 Great Lakes Pharmacy Resident Conference.

Learning Objectives:
Identify the appropriate empiric antibiotics for the treatment of neonatal sepsis
Define toxicities associated with the antibiotics used to treat neonatal sepsis
Self Assessment Questions:
Which of the following antibiotic combinations are guideline recommended and used for the treatment of neonatal sepsis?
A. daptomycin plus ampicillin
B. ceftriaxone plus ampicillin
C. gentamicin plus ampicillin
D. penicillin plus vancomycin
Which of the following is a rare but critical adverse event associated with toxicity of ampicillin?
A. seizure
B. hyperbilirubinemia
C. thrombocytopenia
D. rhabdomyolysis
Q1 Answer: C Q2 Answer: A

Use of letermovir for CMV prophylaxis in high-risk allogeneic HCT recipients

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Purpose: For recipients of an allogeneic hematopoietic-cell transplantation (allo-HCT), cytomegalovirus (CMV) remains a critical complication with potential for progression to multiorgan disease. CMV impairs engraftment establishment, especially due to treatment-related myelosuppression. Primary prophylaxis may be preferred to reduce CMV viremia/disease in recipients at high-risk for reactivation as viremia contributes significantly to morbidity and nonrelapse mortality. Letermovir (LET) is approved for primary prophylaxis in seropositive HCT recipients; however, use in high-risk recipients is not well established. The objective of this study is to determine if high-risk allo-HCT recipients who receive LET have a reduced incidence of CMV viremia versus those who do not.

Methods: This retrospective, single-center cohort study evaluated high-risk allo-HCT recipients between January 2016 to July 2022. Included patients were â‰¥18 years of age, IgG CMV seropositive recipients or IgG CMV seronegative recipients who received a seropositive donor, had established engraftment within 28 days of HCT, and had at least one high-risk feature for CMV reactivation. High-risk features were indicated by one of the following: recipient of a seronegative donor, related or unrelated HLA-mismatched donor, haploidentical donor, T-cell depleted graft, or an umbilical cord blood donor and/or development of grade II graft-versus-host disease requiring â‰¥1 mg/kg/day of prednisone or an equivalent. Patients transplanted between January 2016 to December 2017 and did not receive LET prophylaxis served as the historical control to patients transplanted between January 2018 to July 2022 and received LET prophylaxis following FDA-approval and institution implementation. The primary outcome measure was incidence of CMV viremia detected via DNA PCR at day +168 (week 24) post-HCT that led to treatment escalation. Patient data was collected from the UofL Health - Brown Cancer Center and UofL Hospital electronic health records.

Results/Conclusions: Final results and conclusions to be shared at the 2023 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify patient-specific risk factors for CMV reactivation following allo-HCT.

Discuss appropriate use of LET for CMV primary prophylaxis.

Self Assessment Questions:

Which of the following is a patient-specific risk factor for CMV reactivation?

A. Recipient of a matched related donor (MRD) allograft

B. Avoidance of developing GVHD

C. CMV seropositivity

D. Recipient of a matched unrelated donor (MUD) allograft

Which patient would benefit most from initiation of LET post-HCT?

A. Patient 1: MUD, IgG CMV R+/D+ and baseline CMV PCR undetectable

B. Patient 2: Haploidentical donor, IgG CMV R+/D- and baseline CMV PCR undetectable

C. Patient 3: Haploidentical donor, IgG CMV R-/D- and baseline CMV PCR undetectable

D. Patient 4: MUD, IgG CMV R+/D- and baseline CMV PCR 2500 copies/ml

Q1 Answer: C Q2 Answer: B

Evaluation of Combination Sedation Therapy with Propofol and Dexmedetomidine in the Intensive Care Unit

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Purpose: Sedative agents are administered to 85% of intensive care unit (ICU) patients to relieve the anxiety and stress associated with mechanical ventilation. Current guidelines recommend using propofol and dexmedetomidine over benzodiazepines due to decreased duration of mechanical ventilation, delirium, and ICU length of stay. Despite studies demonstrating that propofol and dexmedetomidine are superior to benzodiazepines for sedation in the ICU, studies evaluating the impact of combination sedation with propofol and dexmedetomidine have been limited. The objective of this study was to assess the impact of sedation with combination propofol and dexmedetomidine on duration of sedation and total sedation exposure compared to propofol or dexmedetomidine monotherapy in mechanically ventilated ICU patients.

Methods: This was a single-center, retrospective, three-arm study which included adult patients admitted to UofL Health-UofL Hospital (ULH) between January 1, 2017 and September 1, 2022. Patients were divided into three arms: propofol monotherapy, dexmedetomidine monotherapy, and combination therapy. Patient specific data was collected and assessed through the electronic health record. Patients in the ICU who required mechanical ventilation for > 24 hours and received continuous sedation with propofol and/or dexmedetomidine for > 12 hours were included. Patients were excluded if they experienced alcohol withdrawal, received ketamine, pentobarbital, continuous infusion midazolam or paralytics during sedation. Patients who received propofol for an indication other than sedation, had life support withdrawn, were incarcerated, or received propofol and dexmedetomidine sequentially with overlap <4 hours were also excluded The primary outcomes included duration of continuous sedation (hours), cumulative dose of propofol (milligrams), and cumulative dose of dexmedetomidine (milligrams). Secondary outcomes included the incidence of bradycardia, hypotension, need for intervention with vasopressors or atropine, and duration of mechanical ventilation (days).

Results/Conclusion: Data collection and analysis is ongoing. Full results and conclusion to be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Review current Pain, Agitation, Delirium, Immobility and Sleep Disruption guideline recommendations for sedation in the ICU.

Discuss the risks and benefits of using propofol or dexmedetomidine over benzodiazepines for sedation in mechanically ventilated patients.

Self Assessment Questions:

Which of the following agents is recommended as a first-line agent for sedation in the ICU?

A. Midazolam
B. Ketamine
C. Propofol
D. Pentobarbital

When compared to benzodiazepines, dexmedetomidine is associated with an increased risk of

A. Bradycardia
B. Delirium
C. Prolonged ICU stay
D. Self-extubation

Q1 Answer: C Q2 Answer: A

Incidence of Rituximab Infusion Reactions in Rituximab Primed vs Saline Primed Lines

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Purpose: Infusion reactions happen in ~35% of first dose infusions of rituximab, a CD20-directed cytolytic antibody used in the treatment of several auto-immune disorders and cancer1,2. A retrospective, comparative study published in 2018 found significantly higher rates of infusion reactions in saline-primed (SP) lines than rituximab-primed (RP) lines (35% vs. 19%, p=0.01)1. We aim to evaluate if the incidence of infusion reactions in patients within BH system treated with first-dose rituximab is different in RP vs SP lines.

Methods: This is a retrospective, multi-center, case-control study reviewing charts of adult patients receiving first dose rituximab within the Baptist Health System. Exclusion criteria includes patients with evidence of prior administrations of rituximab, patients with a documented allergy to rituximab, and patients who received rituximab/hyaluronidase human. The primary outcome is incidence of infusion reaction in rituximab primed vs. saline primed lines. Secondary outcomes include incidence of infusion reaction in pre-specified subgroups such as concomitant chemotherapy, steroid on home medication list, baseline LDH level, baseline ALC level, sex, age, and diagnosis associated with rituximab order. The primary outcome will be evaluated using a chi square test with a p-value set at 0.05 for categorical variables. Secondary outcomes will be evaluated using a chi square or t-test with a p-value set at 0.05 as appropriate for categorical or continuous variables. Logistic regression may be utilized to evaluate the impact of risk factors on incidence of infusion reaction. To achieve 80% power for the primary outcome with an expected infusion reaction incidence of 35% in SP and 19% in RP group, 120 patients are evaluated per group.

Results/conclusions: Statistical analysis is ongoing and will be presented at the Great Lakes Pharmacy Conference.

Learning Objectives:

Explain why rituximab line priming and infusion reactions are important to patient care.
Recall patient specific factors that may lead to an increased or decreased risk of infusion reaction.

Self Assessment Questions:

Which of the following premedication regimens is the NCCN recommended standard of care for a rituximab infusion?

A. Diphenhydramine, acetaminophen
B. Diphenhydramine, acetaminophen, famotidine
C. Diphenhydramine, acetaminophen, famotidine, dexamethasone
D. Diphenhydramine, acetaminophen, famotidine, dexamethasone, hydroxyzine

What patient specific factors may lead to increased risk of infusion reaction?

A. RP lines
B. Appropriate pre-medications
C. Steroid home medication
D. Elevated LDH

Q1 Answer: A Q2 Answer: D

Pain Control For Acute Pancreatitis on General Medicine for Patients Admitted to UI Health

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painful and highly variable presentation. The severity is multifactorial and often dependent on the underlying etiology. Treatment of acute pain for these patients ranges in analgesic drug class used (opioids, NSAIDs, acetaminophen, adjuvants like IV ketamine or lidocaine) and route/administration (IV, PO, PCA) modality. Currently, there are no discrete guidelines on the management of AP pain which leads to variance in treatments. Unmanaged pain can lead to worsening health outcomes and longer admissions. Further research is needed to understand current practice for managing AP.

METHODS: This study is a retrospective, exploratory, single-center, cohort study. Patients who were admitted to general internal medicine services at UI Health with acute pancreatitis between 9/21/20 and 12/31/2021 will be included. Patients under 18 years of age and pregnant females will be excluded. Our primary outcome is the difference between the average pain scores during the first 24 hours after administration of the first pain-relieving medication. Secondary outcomes include comparison of average pain scores within the first 12 hours of administration of the first pain-relieving medication, time to oral tolerance, pain consult frequency, and pain assessment frequency. The primary and secondary pain outcomes will be compared within and across time intervals by cohorts of patients identified by medication exposures during those intervals including those who received opioids only or multi-modal therapy, intravenous only vs non-intravenous analgesics, patient-controlled analgesia (PCA) vs non-PCA, or other adjuvant analgesics or not. Statistical analyses of study endpoints will be assessed using descriptive and inferential statistics using SPSS Statistics for Windows (IBM Corp).

RESULTS: In progress.

Learning Objectives:
Recognize common etiologies of acute pancreatitis.
List the different classes and routes of medications used for pain management in acute pancreatitis.
Self Assessment Questions:
According to the American College of Gastroenterology (ACG) guidelines, what are the most common etiologies of acute pancreatitis?
A. Gallstones
B. Chronic alcohol use
C. Hypertriglyceridemia
D. All of the above
All of the following are common strategies used to manage pain for acute pancreatitis in the hospitalized patient EXCEPT:
A. Patient-Controlled Analgesia (PCA)
B. Multi-Modal Analgesia (NSAIDs, APAP, Opioids, etc.)
C. Epidural Analgesia
D. Oral and IV Opioid Analgesia
Q1 Answer: D Q2 Answer: C

Assessment of preoperative diabetes management for patients undergoing elective surgeries at a Veterans Affairs Medical Center
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glycemic control for patients with diabetes in the preoperative setting is crucial for optimizing outcomes. Studies have shown that Veterans have a higher incidence of diabetes and as a result may be more susceptible to these complications. The purpose of this study is to assess the level of preoperative glycemic control and postoperative complications in a Veteran population undergoing major elective surgical procedures and to determine what, if any, standardization exists at a Veterans Affairs medical center for preoperative instructions for diabetes medications.
Methods: This study is a retrospective electronic chart review of patients with diabetes who underwent elective surgical procedures at Veteran Health Indiana from January 1, 2017 to December 31, 2021. Patients were included if they were admitted for major elective surgeries (one likely resulting in > 24-hour hospital admission) and had a diabetes diagnosis on their problem list (determined with International Classification of Diseases (ICD-10) codes). Patients were excluded if they had zero diabetes medications prior to surgery, had no preoperative glucose(s) measured, were taking chronic steroids, were residing in a long-term care facility, or were managed by an outside provider. The primary outcome was to assess the proportion of patients with preoperative glucose > 180 mg/dL or < 70 mg/dL that had surgical procedures delayed or cancelled due to hyperglycemia or hypoglycemia. Secondary outcomes included incidence of preoperative diabetes medication instructions given, average preoperative A1C, frequency of diabetes medication interventions needed immediately prior to surgery, postoperative complications, average postoperative glucose, number of postoperative hypoglycemic (glucose < 70 mg/dL) and hyperglycemic (glucose > 180 mg/dL) events, and frequency of diabetes medication changes at discharge.
Results and Conclusions: Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.
Learning Objectives:
Define the current guideline recommendations for diabetes management prior to an elective surgery.
Identify potential advantages for a pharmacist-led perioperative diabetes management service.
Self Assessment Questions:

What is the current guideline recommended target range for perioperative blood glucose within 4 hours of a procedure?
A. 80-130 mg/dL
B. 80-180 mg/dL
C. 100-180 mg/dL
D. 140-180 mg/dL
What is a potential advantage for a pharmacist-led perioperative diabetes management service for patients undergoing elective procedures?
A. Increased postoperative infections
B. Increased preoperative hypoglycemic events
C. Worsened surgical outcomes
D. Shorter hospital stays
Q1 Answer: C Q2 Answer: D

Developing Ambulatory Care Clinical Pharmacy Services in a Gender Health Program

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Purpose: Gender-affirming hormone therapy (GAHT) is associated with a variety of risks such as weight gain, acne, hypertension, venous thromboembolism, dyslipidemia, and cardiovascular disease. Ambulatory care clinical pharmacists provide a unique skill set to deliver comprehensive care and management of these risks. To the best of our knowledge, there is no current literature describing the impact of an ambulatory care clinical pharmacist as part of an interdisciplinary gender health team, the objective of this study.

Methods: This IRB-approved retrospective cohort analysis will include adult patients in a Gender Health Program in an underserved community who identify as transgender or nonbinary and had at least one visit with an ambulatory care clinical pharmacist between June 27, 2022 and February 28, 2023. Demographic information (age, sex assigned at birth, gender identity, weight, BMI) will be collected. Other pertinent data to be collected include number of appointments during study period, surgery status, medical comorbidities, mental health comorbidities, insurance status, use of hormone therapy, HIV status, PrEP therapy, nicotine use, and number of medication interventions for targeted disease states (weight management, headache, acne, nicotine cessation, diabetes, hypertension, hyperlipidemia, and gender-affirming hormone therapy). Descriptive statistics will be used to evaluate the benefits of ambulatory care clinical pharmacy services in a Gender Health Program. The primary outcome of this study is the number and type of interventions made by the pharmacist.

Results/Conclusion: The pharmacist has seen a total of 47 patients, with a total of 79 appointments from June 27, 2022 to December 26, 2022. Data collection is ongoing as patients continue to be seen by the pharmacist. Results of this study have the potential to demonstrate ambulatory care clinical pharmacists can achieve positive health outcomes related to comprehensive medication management for this community.

Learning Objectives:
Explain the gaps in literature with transgender/nonbinary health care
Identify potential areas for clinical pharmacist involvement within an interdisciplinary gender health program

Self Assessment Questions:
Which of the following is considered a gap in literature relating to the care of transgender/nonbinary persons?
A. Prevalence of acne among transgender males
B. Psychiatric pharmacist mental health medication management
C. Prevalence of comorbid disease states among transgender persons
D. Ambulatory care pharmacist medication management
Which of the following is an area of potential involvement for a clinical pharmacist in a gender health program?
A. Gender confirming surgery evaluation
B. Acne assessment and management
C. Fertility preservation
D. Sleep apnea assessment and management
Q1 Answer: D Q2 Answer: B

Evaluation of the Safety and Tolerability of Undiluted Intravenous Levetiracetam at a Pediatric Institution

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Failure of initial benzodiazepine therapy in status epilepticus warrants urgent administration of a second-line antiseizure medication. Levetiracetam is preferred due to few adverse effects and lack of therapeutic monitoring. Recent studies support the safety of rapid administration of high-dose, undiluted levetiracetam; however, further research is needed in the pediatric population. The purpose of this evaluation is to evaluate the safety and tolerability of undiluted levetiracetam at a pediatric institution. This is a single-center, retrospective chart review, cohort study. Patients administered high-dose >60 mg/kg (-10%) or 4500 mg of undiluted (100 mg/mL) and diluted (15 mg/mL) intravenous levetiracetam from May 6, 2020â€“July 31, 2022 were included. The primary outcome measure is the assessment of hemodynamic disturbances or infusion related reactions documented within 4 hours of the levetiracetam infusion. The difference of administration time between first-line and second-line therapy and amount of waste from unadministered diluted levetiracetam doses were secondary outcomes. Descriptive statistics were used to assess patient baseline characteristics and outcomes to the incidence of adverse effects. Comparisons of categorical data were completed using a Fischerâ€™s exact test and continuous data analyzed using the student t-test or Mann-Whitney U test. A total of 776 levetiracetam doses were included, 358 doses administered and 418 doses wasted. The doses administered (61 undiluted and 297 diluted) accounted for a total of 252 patients (mean [Â±SD] age, 7.5Â±11 y; dosing weight, 20.1Â±22.1). The most common indication for administration was status epilepticus, followed by acute seizure treatment and loading doses in both groups. The most common site of administration was through a peripheral line (72% and 63%) in the undiluted and diluted groups and all undiluted doses were dispensed from Pyxis while diluted doses dispensed from main pharmacy. Conclusions and significance of the primary and secondary outcomes will be determined upon completion of statistical analysis.

Learning Objectives:

Identify treatment goals for status epilepticus

Discuss the role levetiracetam in status epilepticus

Self Assessment Questions:

Ideally, pharmacologic treatment should be initiated in a patient with status epilepticus within ___ minutes.

A. 5

B. 10

C. 15

D. 20

Which levetiracetam characteristics make it an appealing second line antiseizure medication used in the treatment of status epileptics?

A. Increased adverse effects, few drug interactions, required therapeutic monitoring

B. Limited adverse effects, several drug interactions, lack of therapeutic monitoring

C. Limited adverse effects, few drug interactions, lack of therapeutic monitoring

D. Increased adverse effects, several drug interactions, required therapeutic monitoring

Q1 Answer: A Q2 Answer: C

Evaluation of Midodrine Use in Critically Ill Patients Requiring Intravenous Vasopressors

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Purpose: Midodrine (ProAmatineÂ®) is an alpha-1 agonist that affects arteriolar and venous vasculature to raise blood pressure by increasing vascular tone. It is FDA-approved for orthostatic hypotension but has been used off-label for hypotension in the Intensive Care Unit (ICU). In this study, we evaluated the impact of midodrine on intravenous vasopressor requirements. Additionally, we assessed midodrine continuation through transitions of care and analyzed how it impacts other patient factors like ICU length of stay and ventilator duration.

Methods: A retrospective chart review was performed on all patients 18 or older who received intravenous vasopressors (norepinephrine, epinephrine, phenylephrine, and/or vasopressin) while in the ICU at UW Health Northern Illinois between January 2021 and January 2022.

Intravenous vasopressor days and number of intravenous vasoactive agents required were compared between midodrine adjunctive and non-midodrine groups to assess the primary endpoint. Discharge medication lists were reviewed to determine if midodrine was continued post-hospital stay. If midodrine was discontinued while the patient was in the hospital, the method of discontinuation (taper vs. abrupt discontinuation) was documented. Additional patient outcomes were evaluated by determining length of ICU stay and length of ventilator use (if applicable). Incidence of bradycardia was also assessed between treatment groups as a safety endpoint.

Preliminary Results: 1693 patients received one of the IV vasopressors listed above during the specified time frame. Of the first 100 patients that met inclusion/exclusion criteria, 23 had midodrine added onto therapy to assist in weaning intravenous vasopressors.

Conclusions: Final results and conclusions will be presented during the conference.

Learning Objectives:

Discuss the utility of midodrine for weaning intravenous vasopressors

Review literature on midodrine utilization in the intensive care unit

Self Assessment Questions:

What is the mechanism of midodrine?
A. Î²1 receptor agonist - inotropy
B. V1 and V2 receptor agonist - vasoconstriction and renal water retention
C. Î±1 agonist - vasoconstriction
D. Inhibition of nitric oxide - prevents vasodilation
Which of the following is most accurate about current literature on midodrine utilization for intravenous vasopressor weaning?
A. Midodrine has not been studied as an intravenous vasopressor weaning agent
B. Midodrine has never shown benefit in decreasing intravenous vasopressor requirements
C. Midodrine has always shown benefit in decreasing intravenous vasopressor requirements
D. Midodrine has mixed evidence in decreasing intravenous vasopressor requirements
Q1 Answer: C Q2 Answer: D

The Use of LCP Tacrolimus Versus Immediate Release Tacrolimus in Simultaneous Pancreas-Kidney Transplantation

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While the use of LCP tacrolimus is well established in kidney transplantation, it is not well studied in the simultaneous pancreas-kidney (SPK) population. We report the efficacy and safety of immediate release (IR) tacrolimus versus LCP tacrolimus in SPK transplant recipients at 1 and 3 years. This was a retrospective, single-center, study of adult SPK transplant recipients from 2/1/2003 to 12/31/2021 discharged on IR tacrolimus or LCP tacrolimus. Induction protocol remained unchanged with Thymoglobulin 1.5 mg/kg given on post-operative day 0-4 and steroid free maintenance immunosuppression with mycophenolate. The primary outcome is to compare incidence of acute rejection at 1- year post-transplant between LCP tacrolimus and IR tacrolimus. Secondary outcomes include acute rejection at 3-years, hemoglobin A1C, eGFR, patient survival, allograft survival, at 1- and 3-years post-transplant. Assuming a rejection rate of 20%, a sample size of at least 68 patients was calculated to meet power 80% with alpha of 0.05. There were 74 patients in the IR tacrolimus and 53 patients in the LCP tacrolimus group. At baseline, there was no difference in patientâ€™s BMI, peak PRA, and DCD organ allocation. More patients in the IR tacrolimus group had T1DM. Acute rejection was similar between the groups at 1 year (IR 9.45% vs. LCP 15.09%, p=0.33) and 3 years. The hemoglobin A1c values remained comparable at 3 years; similar finding was observed for eGFR values at 1 year (IR 65.5 +/- 20 vs. LCP 69.79 +/-24.7 ml/min/1.73m2, p=0.69) and at 3 years (IR 62.7 +/-19.3 vs. LCP 70.4 +/-21.3 ml/min/1.73 m2 p=0.24). Patient and allograft survival at 1 and 3 years was comparable. Clinically, the IR tacrolimus group saw a decline in eGFR at 3 years unlike the LCP tacrolimus group. Longer follow up and larger cohort is needed to determine if eGFR benefit persists with LCP Tacrolimus.

Learning Objectives:
Define The pharmacokinetic differences between LCP tacrolimus and IR tacrolimus
Recognize The benefits of using LCP tacrolimus vs IR tacrolimus in SPK transplant recipients

Self Assessment Questions:
Based on the unique pharmacokinetics, LCP tacrolimus was shown to:
A. Increase peak blood concentrations resulting in less neurotoxicity in kidney transplantations
B. Decrease peak blood concentrations resulting in less neurotoxicity in kidney transplantations
C. Increase peak blood concentrations resulting in higher eGFR in kidney transplantations
D. Decrease peak blood concentrations resulting in higher eGFR in kidney transplantations
In this study, patients on LCP tacrolimus experienced:
A. Increased incidence of acute rejection
B. Decreased incidence of acute rejection
C. Comparable eGFR
D. Decreased eGFR
Q1 Answer: B Q2 Answer: C

Reduction of Anticholinergic Burden in Veterans with Dementia through Pharmacist-Driven Deprescribing

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Purpose: The American Geriatrics Society Beers Criteria strongly recommends avoiding anticholinergic medications in patients with dementia or cognitive impairment due to the risk of adverse central nervous system effects. In the Veteran population, approximately 35% of patients with dementia are prescribed a medication regimen with a high anticholinergic burden. The purpose of this project was to determine the impact of pharmacist-driven deprescribing on the anticholinergic burden in Veterans with dementia.

Methods: This quality improvement project was conducted in the outpatient setting at the Veterans Affairs Healthcare System in Louisville, Kentucky. Patients were selected using the VIONE (Vital, Important, Optional, Not needed, Every medication has an indication) Deprescribing Dashboard, which is a Veterans Health Administration population health management tool that addresses patient safety and polypharmacy risk. The dashboard was used to identify patients with dementia or cognitive impairment and prescribed a potentially inappropriate anticholinergic medication as classified by the Beers Criteria. A focused medication review was completed by a pharmacist via electronic chart review, and a templated progress note with patient-specific recommendations was entered in the Computerized Patient Record System (CPRS). The medication prescriber and the patient's primary care provider were advised to perform patient-specific risk-benefit assessment, to deprescribe potentially inappropriate anticholinergic medications, and to consider non-anticholinergic alternatives based on the indication. Study outcomes were reviewed four months after the pharmacist deprescribing note entry. The primary endpoint was the number of patients that had at least one medication with strong anticholinergic properties deprescribed. Secondary endpoints were average change in the anticholinergic risk score per patient, change in the number of patients with documented risk-benefit assessment, and the number of patients with a non-anticholinergic alternative initiated per pharmacist recommendation.

Results and Conclusions: Results and conclusions will be presented at the 2023 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe risks associated with anticholinergic medications in older adults with dementia or cognitive impairment

Recognize pharmacologic and non-pharmacologic alternatives to strong anticholinergic medications for older adults

Self Assessment Questions:

Which of the following are potential risks associated with anticholinergic medication use in older adults with dementia or cognitive impairment?

A. New delirium, sialorrhea, diarrhea

B. Sialorrhea, polyuria, diarrhea

C. Bleeding, worsening dementia symptoms, falls

D. Falls, worsening dementia symptoms, new delirium

AB is a 76-year-old male with Alzheimerâ€™s Dementia who presents to your ambulatory care clinic with his caregiver. He is currently taking paroxetine 20 mg daily for Major Depressive Disorder. Which of the following would be a more appropriate medication to treat his depression given his history of dementia?

A. Amitriptyline 25 mg at bedtime

B. Sertraline 50 mg daily

C. Clomipramine 25 mg at bedtime

D. Olanzapine 5 mg daily

Q1 Answer: D Q2 Answer: B

Impact of bodyweight on hemodynamics in critically ill patients receiving propofol

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frequently used sedative in critically ill patients, where up to 20% of the population is obese. Due to propofolâ€™s pharmacokinetics, obese patients are more likely to accumulate propofol, resulting in increased serum concentrations and exposure. Whether obese patients are at higher risk for propofol-induced hypotension is unknown. This study will evaluate the rate of hypotension in critically ill obese and nonobese patients receiving propofol.

Methods: This is a single-center, retrospective chart review. Mechanically-ventilated adult patients admitted to the medical intensive care unit (ICU) service at UofL Health â€“ UofL Hospital between January 2019 and August 2022 will be eligible for inclusion if they received 4 hours of continuous propofol titrated via hospital-driven protocol. Patients will be excluded if they transferred from an outside facility, received propofol for procedural sedation or burst suppression, received propofol dosed not by total body weight, received a continuous neuromuscular blocker infusion, received a vasopressor at time of propofol initiation, had no documented baseline systolic blood pressure (SBP), or were pregnant, breastfeeding, or incarcerated. The primary outcome is rate of hypotension, defined as at least a 20% reduction in SBP from baseline or initiation of a vasopressor within the first 72 hours of propofol infusion initiation. Secondary and safety outcomes include mortality, duration of mechanical ventilation, ICU and hospital length of stay, attainment of Richmond Agitation Sedation Scale goal, and rates of bradycardia and hypertriglyceridemia. A subgroup analysis will be conducted to examine outcomes between patients with Class I and II obesity and patients with Class III obesity. This study has been approved by the University of Louisville Institutional Review Board.

Results/Conclusion: Results and conclusions will be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe common adverse effects associated with propofol use in the ICU.
Discuss pharmacokinetic and pharmacodynamic factors that contribute to propofolâ€™s common adverse effects.
Self Assessment Questions:
Which of the following is NOT an adverse effect associated with propofol?
A. Hypotension
B. Bradycardia
C. Hypertriglyceridemia
D. Bone marrow suppression
Which of the following is true regarding propofolâ€™s pharmacokinetics?
A. Propofol is lipophilic
B. Propofol follows a two-compartment pharmacokinetic model
C. Propofol has a long duration of action
D. Propofol has a small volume of distribution
Q1 Answer: D Q2 Answer: A

Impact of Elexacaftor/Tezacaftor/Ivacaftor (ETI) on Sputum Collection and Subsequent Culture Results in an Adult Cystic Fibrosis Clinic

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Purpose: Little research has been completed on the correlation between cystic fibrosis (CF) modulator therapy and its effect on respiratory cultures in CF patients. This study evaluated the effect of ETI on respiratory colonization with Pseudomonas aeruginosa.
Methods: This single center, IRB approved, retrospective chart review compared patient data two years immediately prior to ETI initiation with patient data two years post-initiation from January 2017-December 2022. Patients were included in the study if they were at least 18 years old with a diagnosis of CF and had at least one month of ETI dispensed, at least one sputum culture obtained, and were currently on ETI. Those who had not been seen since ETI initiation or received a bilateral lung transplant were excluded. The primary outcome was rate of patients with respiratory colonization post-ETI. Colonization was defined as two or more positive P. aeruginosa cultures in a 12-month period. Decolonization was defined as three consecutive negative P. aeruginosa cultures after previous colonization. Key secondary outcomes included average pre-ETI versus post-ETI lung function (ppFEV1) and relative risk of hospitalization for pulmonary exacerbation. A subgroup analysis of sputum versus throat swab cultures and prior use of modulator therapy for patients meeting the definition of colonization was also performed.
Results: A significant reduction ($p<0.001$) in colonization with P. aeruginosa was observed with 49 patients in the pre-ETI group compared to 25 in the post-ETI group meeting the definition of colonization (n=82). Lung function increased by 9.5% ($p<0.001$). Relative risk of exacerbation requiring IV antibiotics or hospitalization was 3.2. Median number of sputum cultures obtained decreased from seven to three following initiation of ETI ($p<0.001$). No significant differences related to prior modulator therapy were observed.

Conclusion: ETI use resulted in reduced colonization with P. aeruginosa, decreased frequency of exacerbation, and improvement in lung function.
Learning Objectives:
Recall characteristics of CF, its treatment, and its impact on patientsâ€™ lives
Recognize the effect of elexacaftor/tezacaftor/ivacaftor on respiratory colonization with P. aeruginosa in patients with CF
Self Assessment Questions:
Which of the following statements is true of cystic fibrosis?
A. Only one genetic mutation in the CFTR protein is needed to develop CF
B. Treatment for CF can take multiple hours per day to complete properly
C. Complications of CF only affect the lungs
D. Patients with CF have an average life expectancy of 79 years
Based on results of this study, which of the following is true regarding use of elexacaftor/tezacaftor/ivacaftor (ETI)?
A. Only patients who have failed previous modulator therapy are indicated to receive ETI
B. Patients should be counseled to take ETI on an empty stomach for best results
C. There is a risk of developing resistance to ETI therapy if doses are missed
D. Use of ETI is associated with decreased incidence of colonization with P. aeruginosa
Q1 Answer: B Q2 Answer: D

Implementation and Evaluation of Intravenous Push Antibiotics in the Emergency Department

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Safe and timely administration of intravenous (IV) antibiotics is essential, especially for patients in the emergency department (ED). Traditionally, antibiotics have been administered via intravenous piggyback (IVPB). However, intravenous push (IVP) administration, particularly of beta-lactam antibiotics, has been shown to have several advantages over IVPB in the ED while still maintaining safety and efficacy. Thus, the use of IVP for the first dose of antibiotics is increasing in health systems across the country.

The objective of this pre-post quasi experimental study is to implement an IVPB to IVP conversion protocol for three commonly used antibiotics in the ED: cefepime, ceftriaxone, and piperacillin-tazobactam. Adult patients who were prescribed the indexed antibiotics while in an emergency department at Froedtert Health will be included. Patients physically located in the ED but already admitted as either inpatient or observation status during time of antibiotic administration will be excluded. Patients whose antibiotics were ordered in the ED but not given prior to their ED disposition time will also be excluded. Pre-implementation data will be collected for patients receiving the antibiotics between April 1, 2022 and May 30, 2022, and post-implementation data will be collected from April 1, 2023 to May 30, 2023. Data will be collected using electronic health records, an error reporting database, and departmental purchasing information.

The primary outcome is the average time from order verification to completion of antibiotic administration. Secondary outcomes include the average time from order verification to initiation of an additional antibiotic (in applicable patients), estimated average cost savings based on raw acquisition cost of materials, and documented adverse reaction or medication-related event reports following antibiotic administration.

The study is currently ongoing and the results/conclusions will be reported in the final project manuscript.

Learning Objectives:

Review current literature regarding the safety and efficacy of intravenous push administration of beta-lactam antibiotics

Discuss the benefits of implementing an intravenous push protocol in an emergency department setting

Self Assessment Questions:

Which of the following events sparked an increase in the use of intravenous push administration of beta-lactam antibiotics?

A. The small-volume parenteral solutions shortage in 2017

B. The manufacturing quality issues of several antibiotics discovered in 2002

C. The change in leadership of the Food and Drug Administration in 2010

D. The intravenous pump shortage in 2000

According to current literature, intravenous push administration of beta-lactam antibiotics has which of the following benefits when compared to intravenous piggyback administration?

A. Decreased time to antibiotic administration

B. Increased nursing satisfaction

C. Decreased cost

D. All of the above

Q1 Answer: A Q2 Answer: D

Evaluation of Adjunctive Phenobarbital for Use in Alcohol Withdrawal Management

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Benzodiazepines have been an efficacious first line option; however, phenobarbital may offer advantages over benzodiazepines due to its favorable pharmacokinetic profile including a longer duration of action and need for less frequent dosing. Current research is largely limited to the intensive care unit (ICU) and majority of those studies assess ICU length of stay as their primary goal. The purpose of this study is to evaluate adjunctive phenobarbital in admitted patients needing treatment for alcohol withdrawal syndrome (AWS).

This retrospective cohort study evaluated patients over 18 years or older that have been ordered the clinical institute withdrawal assessment (CIWA) protocol for alcohol withdrawal between April 1, 2018 and June 30, 2022. The intervention group will have received phenobarbital in addition to benzodiazepines. Those who did not receive benzodiazepine for AWS, received alcohol as treatment while inpatient, left against medical advice, are pregnant, have intolerance and/or allergies to study medications, transferred to another facility or expired were excluded. Encounters that did not have any CIWA scores eight or greater were also excluded from the study.

The primary outcome will evaluate the time to alcohol withdrawal symptom control defined as CIWA score less than eight with subsequent scores not exceeding eight. Secondary outcomes will review hospital length of stay, ICU length of stay, total benzodiazepine use, total phenobarbital use, duration of dexmedetomidine, and duration of invasive ventilation. The primary outcome will be assessed using the time to event analysis. Continuous variables will be evaluated with the independent t-test. Chi squared test will be used for evaluating nominal variables.

Results will be presented during the Great Lakes Pharmacy Residency Conference in April 2023.

Learning Objectives:

Recognize the guideline recommended medication therapy for alcohol withdrawal syndrome

Review the benefits of phenobarbital in the treatment of severe withdrawal symptoms

Self Assessment Questions:

Per the American Society of Addiction Medicine guideline, what is the first line pharmacotherapy for a patient with a severe alcohol withdrawal symptom based on CIWA?

A. Clonidine
B. Lorazepam
C. Hydroxyzine
D. Gabapentin

Which of the following demonstrates the potential advantage of phenobarbital as a treatment for alcohol withdrawal?

A. Phenobarbital does not require endogenous GABA for its activity
B. Phenobarbital has consistently demonstrated shorter lengths of stay in literature
C. Patients can self administer phenobarbital injections at home for mild withdrawal
D. Phenobarbital is never on drug shortage as it is manufactured in the USA

Q1 Answer: B Q2 Answer: A

Antimicrobial Desensitization Protocol Outcomes

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stepwise administration of increasing dosages. Desensitization is currently recommended as a last-line option in patients where there are no other suitable treatment options. The primary objective of this study is to determine the success rates for pharmacy-driven antimicrobial desensitization protocols. The secondary objective is to analyze patient-specific characteristics associated with desensitization failure.

Methods: This is a retrospective cohort study of patients across Indiana University Health who underwent antimicrobial desensitization from August 1, 2012 to July 31, 2022. Exclusion criteria include patients treated in an outpatient setting, voluntary discontinuation of desensitization by patient or physician without documentation of an adverse reaction, or pretreatment with steroids or histamine-2 receptor antagonists that are not part of an existing desensitization plan or medically necessary for other concomitant conditions. The primary outcome is the incidence of antimicrobial desensitization success, defined as the completion of the protocol plus at least 48 hours of confirmed, therapeutic maintenance doses. Secondary outcomes include determining if doses and administration times adhered to the recommendations within the antimicrobial desensitization protocol, evaluation of the types and severity of adverse reactions experienced, and the evaluation of the setting in which the antimicrobial desensitization took place.

Results and Conclusion: Data collection and analysis are currently in progress. Results and conclusions will be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe how antimicrobial desensitization is achieved and how temporary tolerance is induced
Identify current guidance for implementation and utilization of desensitization protocols in an inpatient setting

Self Assessment Questions:

Which cells are targeted in the induction of tolerance when using an antimicrobial desensitization protocol for a documented allergy?

A. Mast cells
B. Erythrocytes
C. Macrophages
D. Basophils

What resource should be consulted for examples of a desensitization protocol for a patient who needs treatment with colistimethate despite a documented allergy?

A. A. All manufacturers of colistimethate are required to provide desensitization recommendations
B. B. Providers should avoid desensitization attempts if they are unable to readily access published desensitization protocols
C. C. Large, randomized, placebo-controlled studies with well-established protocols are readily available for implementation
D. D. Providers should consult their ID and pharmacy departments to develop a protocol for desensitization if one has not already been established

Q1 Answer: A Q2 Answer: D

Impact of a Discharge Medication Delivery Program on Readmission Rates in Patients with Heart Failure or Acute Myocardial Infarction

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Heart failure is a condition that affects thousands of patients across the United States. Another common heart condition is acute myocardial infarction. Patients with heart failure or acute myocardial infarction have an increased risk for hospital readmission, which could potentially be mitigated by using discharge prescription delivery programs (Meds to Beds). Current studies have shown mixed results when evaluating the impact of Meds to Beds on hospital readmission within 30 days. Additionally, few studies have assessed the use of Meds to Beds in a specific patient population. The purpose of this research study is to evaluate the impact of Meds to Beds on hospital readmission at 30 days in patients originally admitted for a heart failure exacerbation or acute myocardial infarction.

Data was collected from September 2022 through February 2023. On hospital admission, patients originally admitted for a heart failure exacerbation or acute myocardial infarction were asked if they would like new prescriptions delivered to the bedside at discharge or pick up new discharge prescriptions at a home pharmacy. At least 30 days post-discharge, each patientâ€™s electronic health record was examined to determine if the patient was readmitted for heart failure or acute myocardial infarction complications (primary outcome) or readmitted for any reason (secondary outcome). Additionally, patients were asked about ease of medication delivery or pick up, any issues related to unforeseen medication costs, and if refills of discharge medications related to reason for hospital admission were obtained. If hospital readmission at 30 days could not be determined from the electronic health record, the patient was asked about readmission at 30 days in addition to the other questions.

Final results and conclusions will be presented at the 2023 Great Lakes Pharmacy Regional Conference.

Learning Objectives:
Identify medications that are part of guideline-directed medical therapy for patients with acute myocardial infarction or heart failure.
Describe the impact of discharge prescription delivery programs on hospital readmission based on the results of current literature.
Self Assessment Questions:
Based on the ACC/AHA guidelines, which of the following medication classes is indicated in all patients without contraindications who are diagnosed with acute myocardial infarction or heart failure?
A. Angiotensin-converting enzyme inhibitors
B. Statins
C. Beta blockers
D. Calcium channel blockers
Which of the following describes the findings of current literature regarding the impact of discharge prescription delivery programs on hospital readmission?
A. Data suggests using discharge prescription delivery programs positively impacts hospital readmission only in cardiology patients.
B. Study results are mixed, and more studies are needed to investigate the potential benefit of these programs on hospital readmission.
C. Data suggests using discharge prescription delivery programs positively impacts hospital readmission.
D. There is no benefit to using discharge prescription delivery programs.
Q1 Answer: C Q2 Answer: B

Pharmacist Transitions of Care Telephonic Outreach Reduced Hospital Readmission Rates for Medicare and Medicaid Patients
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Purpose: To assess the reduction in Medicare patientâ€™s hospital readmission rates when engaged by a pharmacist-led multidisciplinary transitions of care team. Previous studies have shown readmission rate improvements by transitions of care interventions. This project describes a robust approach by pharmacists to ensure discharged patientâ€™s needs are comprehensively considered telephonically before the first post discharge visit is scheduled. The primary objective of this study is to evaluate transition of care interventionâ€™s impact on readmission rates. This studyâ€™s secondary objectives are to assess the correlations between patient medications, diseases, and readmission rates.

Methods: This retrospective review considered patients aged â‰¥18 who were admitted between 08/2021 â€“ 12/2022. This study was in an outpatient family medicine residencyâ€™s clinic. The pharmacist phoned the discharged patient within 72 hours of discharge to discuss the discharge instructions, and identify any assistance needs (e.g. social worker, diabetes educator, etc). The pharmacist ensures those care team members are co-scheduled for the patients post-discharge office visit. The specific interventions provided by the care team were tracked and assessed with patient readmissions. Patients who could not be reached or refused the intervention served as the control group for any comparisons (i.e. readmission rate) and statistical analysis of outcomes. The chi square, t-test and spearman-rho were applied as appropriate to determine the study resultâ€™s significance. An alpha of 0.05 was used for this study.

Preliminary results: When a pharmacist intervention was made patients were less likely to be readmitted within 30 days of discharge when compared to those who did not receive a pharmacist's intervention (8% vs. 21%).

Conclusion: Data is still being collected and final results and conclusion will be presented at the Great Lakes Pharmacy Resident Conference in April 2023 at Purdue University .

Learning Objectives:
Identify criteria that transition of care encounters must be meet to be reimbursed by Medicaid and Medicare services
Discuss the benefits of pharmacist led interventions during the transition of care process
Self Assessment Questions:
What are the requirements needed to be met to code 99495 for a transition of care visit by Medicare and Medicaid services?
A. Communication (direct contact, telephone, or electronic) with the patient or caregiver within two business days of discharge
B. Medical decision making of at least moderate complexity during the service period
C. A face-to-face visit within 14 days of discharge
D. All of the above
Which of the following interventions did the pharmacist provide to ALL patients who answered the phone call?
A. Referral to behavioral health specialist
B. Medication reconciliation
C. Use of interpretation services
D. Lab order
Q1 Answer: D Q2 Answer: B

Continuation Rates for Proton Pump Inhibitors After a Duration Limit Change in Medicaid Formulary
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Purpose:
Current literature suggests that proton pump inhibitors (PPIs) are routinely over-prescribed to patients without a clear indication for long-term therapy. The objective of this study is to analyze the prescribing patterns of physicians within an academic outpatient internal medicine clinic before and after a Medicaid insurance formulary change on PPI duration limits. This study aims to see how many of those patients who were forced to stop PPIs needed to continue them once they were stopped.

Methods:
This study has been submitted to the Institutional Review Board for approval. This is a retrospective, cohort study involving a review of patient charts from an outpatient internal medicine clinic from July 2020 to June 2022. The primary endpoint is a prescription for PPIs beyond 12 weeks of therapy after the formulary change. The primary investigator will compare patients who received a PPI before and after July 2021, which is the date a Kentucky Medicaid insurance provider allowed patients to PPI therapy without the presence of a guideline approved indication beyond 12 weeks. This will allow the primary investigator to evaluate the number of patients who meet the guideline recommended PPI use. This is an important factor to know for prescribers as PPIs have been shown to have severe side effects such as the development of kidney disease and osteoporosis, especially when used long-term (greater than 12 weeks). The following data will be collected: age, duration of PPI use July 2020-June 2021, duration of PPI use July 2021-June 2022, PPI that was used, alternative gastroesophageal reflux disease treatment used, indication for PPI treatment, and any documentation of known side effects from long-term PPI use.

Results and Conclusion:
Will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:
Identify disease states that require more than 12 weeks of PPI therapy.
Explain the complications of long-term PPI use.
Self Assessment Questions:
Which is not a disease state that should require more than 12 weeks of PPI therapy?
A. Uncomplicated GERD
B. Barrettâ€™s esophagus (BE)Â
C. NSAID bleeding prophylaxis
D. Eosinophilic esophagitis
Consequences of long-term PPI use include all of the following except
A. Increased risk of Clostridioides difficile Infection
B. Increased risk for osteoporosis
C. Increased risk of diabetes
D. Financial burden
Q1 Answer: A Q2 Answer: C

Evaluation of dopamine use at a large teaching hospital

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Purpose: Healthcare staff titrate off a dopamine infusion like other vasopressors which can lead to delay in medication removal due to dopamineâ€™s unique effect on hemodynamics. Currently there is not a protocol for dopamine infusion titration at this institution. The purpose of this research is to ensure safe and effective use of dopamine.

Methods: This was a single-center retrospective chart review of adult patients (n = 250) who received dopamine for inotropic or chronotropic support from July 1, 2018 â€“ July 1, 2022. Dopamine for a renal indication was excluded. Titration start was defined as two consecutive decreases in infusion rate. Effective titration off dopamine was defined as a final rate of 0 mcg/kg/min, 30 consecutive minutes off dopamine, no up-titration of other vasopressors, and not starting another vasopressor. The primary endpoint was to determine the effect titrating dopamine to below 5 mcg/kg/min compared to stopping dopamine at 5 mcg/kg/min has on time to discontinuation of dopamine infusion. Secondary endpoints include frequency of increasing the dopamine infusion rate during titration off and use of secondary vasopressor agents. A Mann-Whitney U test was performed to determine if there was a difference in the primary endpoint.

Results: Mean time on dopamine was significantly different between below 5 mcg/kg/min (2021 minutes) and at 5 mcg/kg/min (1385 minutes), p = <.001. During titration off dopamine the infusion rate was increased in 36.8% of patients 98.9% related to hemodynamic instability; 52.8% of patients were on secondary vasopressors.

Conclusion: Mean time on dopamine was significantly different between the two dopamine titration rate groups, which shows a correlation between dopamine infusion stop rate and total time on a dopamine infusion. Larger multi-site prospective studies are needed to demonstrate causation. Limitations of this study include sample size, and assumption of proper charting.

Learning Objectives:
Discuss dopamine's dose-dependent effects on hemodynamics.
Recall an adverse effect limiting the use of intravenous dopamine.
Self Assessment Questions:
What receptor dose dopamine primarily act on at low doses of 0.5-2 mcg/kg/minute?
A. Beta-1
B. Dopamine-1
C. Dopamine-2
D. Alpha-1
Which of the following adverse effects is associated with intravenous dopamine therapy?
A. Arrythmias
B. Constipation
C. Thrombocytopenia
D. Oliguria
Q1 Answer: B Q2 Answer: A

Evaluation of Vancomycin De-Escalation After The Addition of MRSA Nasal Swab In SSTIs

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cellulitis. Due to growing resistance rates and the challenging pharmacokinetic profile of vancomycin, Frankfort Regional Medical Center Antimicrobial Stewardship Committee implemented the use of MRSA nasal surveillance as a tool to aid in de-escalating vancomycin in skin and soft tissues based on supportive evidence. MRSA nasal screening has recently been studied in other various diseases such as community-acquired pneumonia and diabetic foot infections. While there is currently no guideline-directed recommendation for the use of MRSA nasal screening in SSTIs, one individual study revealed up to a 98% negative predictive value. The objective of this study is to compare the time of vancomycin de-escalation in SSTIs before and after the addition of MRSA nasal surveillance.

Methods: This single-centered, retrospective chart review evaluated the time to de-escalation of vancomycin in patients admitted for simple SSTIs without major risk factors for MRSA. Inclusion criteria includes patients who received at least 48 hours of vancomycin IV and had at least one admitting diagnosis of simple SSTIs. The pre-intervention group includes patients admitted to Frankfort Regional Medical Center from Sept 1st, 2021 to February 1st, 2022, and September 1st, 2022 to February 1st, 2023 for the post-intervention group. Patients will then be stratified into two groups based on whether they received an MRSA nasal swab within 48 hours and were on IV vancomycin or they did not receive an MRSA nasal swab and were on IV vancomycin. Outcomes will be measured as total days of therapy with vancomycin and whether they discretely received an MRSA nasal swab within 48 hours of admission.

Results/Conclusion: Data is currently being collected, and results will be presented at the conference.
Learning Objectives:

Explain the benefit of early de-escalation of vancomycin in SSTIs on patient outcomes
Define ideal antibiotic regimens and duration of therapy in simple skin and soft tissue infections

Self Assessment Questions:

What is the recommended duration of therapy for simple SSTIs without signs of systemic infection?
A. 21 days
B. 14 days
C. 7-14 days
D. 5 days

Which of the following antibiotics cover MRSA?
A. Ceftriaxone
B. Piperacillin/Tazobactam
C. Doxycycline
D. Ciprofloxacin

Q1 Answer: D Q2 Answer: C

Impact of empiric SMOFlipidÂ® utilization on direct bilirubin levels in a neonatal intensive care unit

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Continuous intravenous lipid emulsions (ILE) are utilized as a component of total parenteral nutrition (TPN) in the neonatal intensive care unit (NICU) population to provide adequate nutrition for growth. ILE infusions can lead to complications such as intestinal failure-associated liver disease (IFALD) which can progress to liver failure requiring transplantation. IFALD has been linked to the soybean oil content of ILE as the high omega-6 fatty acid content displaces bilirubin from albumin leading to elevated direct bilirubin levels. Historically, IntralipidÂ® was the preferred agent in the NICU population at our institution. However, a recent shortage of IntralipidÂ® led to empiric SMOFlipidÂ® use in the NICU. The lower soybean oil content in SMOFlipidÂ® is thought to decrease incidence of IFALD. This study will compare the direct bilirubin levels in the NICU population before and after the IntralipidÂ® shortage to evaluate potential benefit of empiric SMOFlipidÂ® utilization.

This will be a retrospective cohort study of patients admitted to the NICU at C.S. Mott Childrenâ€™s Hospital in Ann Arbor, Michigan. Patients will be evaluated for inclusion if they were admitted to the NICU from February 1, 2020-July 31, 2021 and received empiric IntralipidÂ® or admitted to the NICU from November 1, 2021-April 30, 2022 and received empiric SMOFlipidÂ®. Exclusion criteria will include patients transferred from an outside hospital and those with baseline liver dysfunction. Data collected will include gestational age at delivery, gender, birthweight, ethnicity, dose of lipids, use of ursodiol or phenobarbital, duration of initial course of lipid therapy, direct bilirubin closest to initiation of lipid therapy, and peak direct bilirubin in the first ninety days of lipid therapy or discharge, whichever is sooner. The primary outcome will be incidence of direct hyperbilirubinemia in patients initiated on empiric SMOFlipidÂ® versus IntralipidÂ®.

Learning Objectives:

Describe Intestinal Failure-Associated Liver Disease, hyperbilirubinemia, and the impact it has on the NICU population
Explain the purported relationship between soybean oil and Intestinal Failure-Associated Liver Disease

Self Assessment Questions:

What bilirubin level is used to indicate IFALD?
A. Direct bilirubin less than 2
B. Direct bilirubin greater than 2
C. Indirect bilirubin less than 2
D. Indirect bilirubin greater than 2

What is the suggested mechanism of soybean oil leading to IFALD?
A. Low DHA and EPA in soybean oil
B. High omega-6 fatty acid content displaces bilirubin from albumin leading to elevated direct bilirubin levels
C. Phytosterol content in soybean oils has been shown to decrease bile flow and is thought to be hepatotoxic
D. All of the above

Q1 Answer: B Q2 Answer: D

Assessment of Antibiotic Utilization in Sepsis Order Sets Initiated in the Emergency Department

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department with sepsis. Providers may select subsets within the sepsis order set based on the suspected source of infection, prompting the provider to pick broad-spectrum antibiotics based upon guideline directed therapy. The purpose of this research is to determine the accuracy with which the order subsets initiated in the emergency department at IU Health Ball Memorial Hospital predict the antibiotics the patient will continue to receive during their hospital stay.

This retrospective, quality improvement study was exempt from comprehensive review by the Institutional Review Board. Patients that received treatment under the following sepsis order subsets between July 1, 2022 and December 31, 2022 will be analyzed: Respiratory (Community-Acquired), Respiratory (Healthcare-Acquired), Urinary, Soft Tissue, and Intra-Abdominal. The following data from the aforementioned order sets will be collected: patient risk factors that warrant broader activity, such as travel history, prior Pseudomonas aeruginosa or methicillin-resistant Staphylococcus aureus infection, or broad-spectrum antibiotic use within the last 90 days; culture and susceptibility data; duration of antibiotic therapy; time to de-escalation; and length of stay. Exclusion criteria include any patient who does not receive antibiotic therapy under the five subsets listed.

The following number of patients under the selected order subsets were identified for this studyâ€™s review; 223 community-acquired pneumonia, 92 healthcare-acquired pneumonia, 68 urinary, 113 soft tissue, and 100 intra-abdominal. All final results and conclusions will be presented at the annual Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Define sepsis in relation to Systemic Inflammatory Response (SIRS) criteria.

Identify patient factors that warrant initiation of broad-spectrum antibiotic therapy.

Self Assessment Questions:

In addition to a microbial source, how many SIRS criteria must be present for a patient to meet sepsis criteria?

A. 1

B. 2

C. 3

D. 4

Which of the following patient factors warrants initiation of broad-spectrum antibiotic therapy?

A. Penicillin allergy (unknown reaction)

B. Age greater than 75

C. Broad-spectrum antibiotic use within the last 90 days

D. Patient has one SIRS criteria element present

Q1 Answer: B Q2 Answer: C

Hemodynamic impact of osmotic therapies in traumatic brain injury

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Background: Osmotic agents are effective for intracranial hypertension treatment in traumatic brain injury (TBI), but limited data exists describing their effect on hemodynamics in this population. This study evaluated the impact of osmotic therapies on systolic blood pressure (SBP) in patients with TBI.

Methods: This IRB approved retrospective study evaluated doses of intermittent infusion hypertonic saline (HTS) or mannitol (MAN) administered to adult patients with moderate-severe TBI. Doses of osmotic therapies were excluded if two doses were administered within 6 hours (h). Blood pressures were collected at pre-specified time intervals after each HTS or MAN dose during the 72 h after the first dose. Primary outcome was absolute SBP change from baseline. Secondary outcomes were percent SBP change from baseline, absolute and percent change in mean arterial pressure (MAP), incidence of SBPâ‰¤90 mmHg or MAPâ‰¤65 mmHg. Data were evaluated using SPSS v.28 and expressed as median [IQR].

Results: Of 238 patients screened, 74 received 118 evaluated doses (83 HTS and 35 MAN). No baseline characteristics were different between groups, with 80% of patients admitted for severe TBI. Absolute change in SBP differed at each time point from 1 h (-9 [-24,7] HTS vs 4 [-5,10] MAN, mmHg, p=0.02) to 6 h (-10 [-44,10] HTS vs 0 [-8,13] MAN, mmHg, p=0.02) except at 4 h. Percent change SBP from baseline, absolute change MAP from baseline, and percent change MAP from baseline results followed the same pattern as absolute SBP. SBPâ‰¤90 mmHg occurred more frequently after HTS doses (19% HTS vs 0% MAN, p<0.01), but MAPâ‰¤65 mmHg was not different (36% HTS vs 34% MAN, p=0.39).

Conclusion: Osmotic agents may play a role in hemodynamic management in patients with TBI. In patients with moderate to severe TBI, HTS resulted in sustained reduction of SBP compared to MAN, contrary to previous literature.

Learning Objectives:

Discuss the proposed hemodynamic changes for osmotic therapies for the treatment of traumatic brain injury

Describe the potential dosing strategies for osmotic therapies for the treatment of traumatic brain injury

Self Assessment Questions:

Which of the following are recommended by the Brain Trauma Foundationâ€™s Guidelines for the Management of Severe Traumatic Brain Injury 4th Edition for reduction of intracranial pressure in patients with traumatic brain injury?
A. Hypertonic saline intermittent infusion
B. Mannitol
C. Dextrose 5% with Lactated Ringers infusion
D. A & B
What is the guideline recommended dosing range for mannitol that is effective for patients with TBI?
A. 0.25 g/kg - 1 g/kg
B. 0.1 g/kg - 0.3 g/kg
C. 1 g/kg - 2 g/kg
D. 2.5 g/kg - 3 g/kg
Q1 Answer: D Q2 Answer: A

Pharmacist-Led Optimization of Heart Failure Guideline-Directed Medical Therapy in Hospitalized Patients (PHOTOGRAPH-HF)
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medical therapy (GDMT). Patients who are initiated on GDMT in the hospital or upon discharge are more likely to be on therapy at one year compared to those for whom initiation is deferred. Thus, hospitalizationâ€"either related or non-related to heart failureâ€"is an opportunity to continue, initiate, and further optimize GDMT.

Purpose: The purpose of this study is to evaluate the impact of a pharmacist-driven intervention to optimize GDMT for hospitalized patients with HFrEF.

Methods: PHOTOGRAPH-HF was a quasi-experimental study of patients with HFrEF hospitalized for any principal diagnosis. The study site was a 315-bed academic, safety net medical center. Patients were included if they carried a heart failure diagnosis, had a most recent left ventricular ejection fraction (EF) < 40%, and were admitted to an internal medicine team. In the intervention group, the pharmacist investigator provided GDMT optimization recommendations to the medicine teams throughout the hospitalization. Outcomes were based on a GDMT optimization score, the sum of positive (+1 for new initiations and dose increases) and negative (-1 for discontinuations or dose decreases) therapeutic changes at hospital discharge. The primary outcomes were the proportion of patients with a positive GDMT optimization score, as well as the median GDMT optimization score. Secondary outcomes included financial interventions (i.e., prior authorizations, copay cards, and free trials), the proportion of new GDMT prescriptions that were dispensed within 30 days of discharge, and prescription copays.

Results: Data collection is ongoing and results are pending.

Learning Objectives:
Identify medications and respective doses recommended as GDMT in HF guidelines
Select appropriate GDMT adjustments for hospitalized patients with HFrEF based on HF guidelines, available literature, and patient-specific factors
Self Assessment Questions:
Which classes of medications have been shown to reduce mortality in HFrEF?
A. Beta blockers, ACEi/ARB/ARNi
B. Beta blockers, ACEi/ARB/ARNi, MRA
C. Beta blockers, ACEi/ARB/ARNi, MRA, SGLT2i
D. Beta blockers, ACEi/ARB/ARNi, MRA, SGLT2i, loop diuretics
Which of the following regimens is considered target dose of GDMT?
A. Metoprolol tartrate 100 mg PO BID
B. Metoprolol succinate 100 mg PO daily
C. Sacubitril/valsartan 97/103 mg PO BID
D. Spironolactone 25 mg PO daily
Q1 Answer: C Q2 Answer: C

Safety of Venous Thromboembolism Prophylaxis in Underweight Hospitalized Veteran Patients
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Purpose:
Venous thromboembolism (VTE), including deep vein thrombosis and pulmonary embolism, is a potential complication seen during hospitalizations. Unfractionated heparin and low-molecular-weight heparins such as enoxaparin are commonly utilized for inpatient VTE prophylaxis. Currently, there are no practice guidelines that provide specific guidance on VTE prophylaxis dose adjustments in underweight patients. The purpose of this study is to determine the safety of standard pharmacologic VTE prophylaxis dosing in underweight patients as compared to non-underweight patients.

Methods:
This is a single-center, retrospective cohort study at the Veterans Affairs (VA) Healthcare System in Louisville, Kentucky. The Computerized Patient Record System (CPRS) will be utilized for data collection. Patients will be included if they are over the age of 18 with hospitalization between October 1, 2019 - October 1, 2022 and received VTE prophylaxis with either enoxaparin 40mg subcutaneously daily or heparin 5,000 units subcutaneously three times a day. Patients will be separated into two groups: underweight (body mass index [BMI] < 18.5 kg/m2 or weight < 60 kg) and non-underweight (BMI â‰¥ 18.5 kg/m2). Patients will be matched according to their pharmacologic VTE prophylactic agent, use of antiplatelets, hemoglobin value less than 9 g/dL, surgery vs non-surgery, and ICU vs non-ICU. The following baseline characteristics will be collected: age, gender, ethnicity, BMI, weight, estimated creatine clearance, hemoglobin, platelets, comorbidities and concurrent medications that can increase risk of bleeding. The primary outcome is a composite of bleeding events, defined by the International Society on Thrombosis and Haemostasis, that occurred within 30 days of the last VTE prophylaxis dose. The secondary outcomes are the occurrence of VTE within 30 days of last VTE prophylaxis dose and the individual components of primary outcome including major bleeding, clinically relevant non-major bleeding, and minor bleeding.

Results/Conclusion:
Data is being collected and results will be presented at the conference.
Learning Objectives:
Discuss the current CHEST guideline recommendations for VTE prophylaxis.
Identify factors that can increase the risk of bleeding in hospitalized patients on VTE prophylaxis
Self Assessment Questions:
MS is a 74 yo female (Ht 68in, Wt 76kg) with a PMH of HTN, HFrEF, T2DM, COPD and breast cancer (receiving chemotherapy) who was admitted to the medicine floor for bacterial pneumonia. She has no other pertinent past medical history. Her most recent SCr is 0.8 mg/dL and LFTs are WNL. Which of the following would be the most appropriate VTE prophylaxis regimen for MS?
A. Enoxaparin 40 mg subcutaneous once daily
B. Unfractionated heparin 5,000 units subcutaneous once daily
C. Unfractionated heparin 7,500 units subcutaneous three times a day
D. Enoxaparin 30 mg subcutaneous once daily
Which of the following factors increases the risk of bleeding while on VTE prophylaxis?
A. Intravenous vancomycin
B. History of tobacco use
C. Systemic corticosteroids
D. Type 2 diabetes
Q1 Answer: A Q2 Answer: C

Standardization of Sterile Compound Training Across a Community Directed Health System
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Purpose: Sterile compounding is an important process for providing necessary and safe medications to patients. Individual sites within the studied community directed health system have protocols to train pharmacy staff. However, no systemwide policy is available to coordinate this process. Development of a systemwide protocol will help to document and maintain competencies in sterile compounding, improve consistency with sterile compounding operations, and increase the ability to utilize pharmacy technicians between the system facilities. The purpose of this project is to create a systemwide protocol to address both initial and continuous sterile compound training and education. Methods: Assessment of available online training programs was completed. A program was chosen based on convenience for monitoring completed tasks, high quality training, regular updates to adhere to current requirements, and financial considerations. A systemwide gap analysis was developed and completed to identify deficits in training, recordkeeping, and continuous education. Results from the gap analysis found opportunities to standardize frequency of hand hygiene testing/media fill tests, completion of competencies, and documentation of hazardous drug trainings. Once opportunities were identified and an online didactic training program was selected, the sterile compounding protocol was restructured to include systemwide specifications for initial hands-on training, frequency and execution of gloved fingertip testing, media fill testing, surface sampling, and continuing education requirements based on state law requirements and 2022 United States Pharmacopeia <797> and <800> standards. The protocol will be shared with key stakeholders for feedback, then presented to the system pharmacy and therapeutics committee for approval. The revised training protocol will be implemented at thirteen community hospitals across Wisconsin and Michigan. Systemwide education will include presentation of the protocol highlights to pharmacists and pharmacy technicians involved in training. Success of the training protocol will be evaluated through a follow-up gap analysis after implementation. Results/Conclusions: Study is in progress.

Learning Objectives:
Review sterile compound training requirements found in the 2022 USP <797> and <800> guidelines.
Discuss potential considerations and challenges involved in creating a systemwide sterile compound training policy.
Self Assessment Questions:
Based on the 2022 USP <797> guidelines, how frequently must personnel who prepare sterile compounds pass hand hygiene/fingertip testing for facilities that prepare Category 2 compounded products?
A. Monthly
B. Every 3 months
C. Every 6 months
D. Annually
Which of the following is the correct way to incubate a media fill test?
A. First at 30Â°â€“35Â° C, then at 20Â°â€“25Â° C for a minimum of 7 days at each temperature
B. First at 20Â°â€“25Â° C, then at and 30Â°â€“35Â° C for a minimum of 7 days at each temperature
C. 30Â°â€“35Â° C for a minimum of 14 days
D. 20Â°â€“25Â° C and 30Â°â€“35Â° C for a minimum of 7 days at each temperature, in either order but specified in the facilityâ€™s SOPs
Q1 Answer: C Q2 Answer: D

Prospective Evaluation of Nausea and Vomiting Control in Patients Receiving Oral Oncolytics
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Limited data regarding emetogenic classification has challenged expertsâ€™ ability to give concise recommendations for patients receiving oral oncolytics. The current National Comprehensive Cancer Network (NCCN) recommendations for oral oncolytics have been primarily adapted from experience with intravenous (IV) chemotherapy agents, and additional risk factors for oral oncolytic emetogenic potential have not been assessed. The primary outcome of this study is to evaluate the severity of nausea and vomiting from patient reported nausea and vomiting scores. The secondary outcome is to compare the frequency of emesis in patients at the Herbert Herman Cancer Center (HHCC) to the NCCN proposed emetogenic potential categories of the prescribed oral oncolytic.
This is a prospective evaluation with the purpose to evaluate the incidence of nausea and vomiting in patients receiving oral oncolytic therapy at the HHCC. Patients will be evaluated at one week, two weeks, and four weeks after initiating an oral oncolytic to monitor adherence and side effects. Patients are contacted by telephone or via MyChart app for reporting adherence and side effects. Patient reported scores for side effects will be scaled from 0 to 10, where any score greater than 0 will indicated a â€œyesâ€ response to having experienced nausea and/or vomiting, and a score equal to 0 will indicated a â€œnoâ€ response. Patients will also be asked the frequency of antiemetic use in the previous 24 hours.
Patient scores of nausea and vomiting will be collected cumulatively and per individual oncolytic agent. The frequency of emesis for each oncolytic agent with or without antiemetic use will be calculated and compared to the NCCN guidelines category.
Risk factors that could potentially increase the risk of emesis will be assessed. These risk factors include previous chemotherapy treatment, little or no alcohol use, concomitant corticosteroids, history of anxiety, and history of motion or morning sickness.

Learning Objectives:
Describe the difference between emetogenic potential categories of oral oncolytics compared to intravenous (IV) chemotherapy
Discuss risk factors that may be associated with an increased potential for emesis in patients receiving chemotherapy
Self Assessment Questions:
Which one of the following statements is most appropriate when accurately defining or describing the emetogenic potential of oral oncolytics?
A. One of the challenges in determining emetogenic potential includes the use of prophylactic antiemetics in clinical trials
B. Oral oncolytic emetogenic potential is only determined by the IV formulation of the drug
C. All oral oncolytics have minimal to low emetogenic potential
D. Oral oncolytics have the same emetogenic potential as intravenous (IV)
Your patient is a 42-year old female with a past medical history significant of HTN, DM, stage 3 breast cancer. She admits to 3 drinks (alcohol) a day, and recreational marijuana use. She has 2 daughters, and admits that she suffered from severe morning sickness during her pregnancies. Which of the following risk factors may be associated with an increased risk of emesis for this patient while receiving chemotherapy? I. Regular alcohol use II. History morning sickness III. Female gender
A. I and II
B. II and III
C. I and III
D. All of the above
Q1 Answer: A Q2 Answer: B

Extended Infusion Beta-lactams in Pediatric Patients with Febrile Neutropenia

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pediatric patients with FN range from 0.4-3%. Extended infusion (EI) of beta-lactam antibiotics leads to improved pharmacodynamic parameters and is associated with enhanced antimicrobial activity. A recent study demonstrated significantly better overall treatment response in adult patients with documented infections and high-risk FN who received EI vs. standard infusion (SI) piperacillin-tazobactam. There are currently no studies evaluating clinical outcomes of EI beta-lactam use in pediatric patients with FN.

Methods: This study will be a single-center retrospective cohort study with a time frame between September 2017-September 2022. The primary objective is to assess the time to fever resolution in patients with FN who received EI vs. SI of beta-lactam antibiotics. Secondary objectives include the difference in 30-day mortality and hospital length of stay (LOS) between the EI and SI groups. This study will include pediatric patients admitted to pediatric hematology, oncology, or BMT services at Michigan Medicine who were diagnosed with FN during hospital admission or admitted for FN following chemotherapy. Patients must have received EI or SI piperacillin-tazobactam, cefepime, or meropenem for at least 48 hours to be included in this study.

Statistical analysis: Time to defervescence will be measured through Kaplan-Meier time-to-event analysis. For hospital LOS and other continuous data, a 2-tailed studentâ€™s t-test will be used. Fisher's exact test will be utilized to compare 30-day mortality. Mannâ€“Whitney U test will be utilized for non-normally distributed dichotomous data. Multivariate analysis will be applied to assess the effect of other variables on the primary outcome.

Results and conclusion: data collection is ongoing, the results and study conclusion will be presented at the Great Lakes Pharmacy Residents Conference.

Learning Objectives:
Describe â€¢ the background information about febrile neutropenia
Review â€¢ the literature of utilization of beta-lactams extended infusion in febrile neutropenia
Self Assessment Questions:
Which of the following is a factor associated with low-risk febrile neutropenia?
A. Uncontrolled disease
B. Mucositis grade 3-4
C. Anticipated neutropenia duration of <7 days
D. Pneumonia
Which of the following patients meets the criteria for febrile neutropenia?
A. Patient with ANC of 300 cells/mm3 and had one temperature of 38.0Â°C
B. A patient with a fever (temperature of 38.5Â°C) and ANC of 2000 cells/mm3
C. Patient with a temperature of 37.8Â°C and ANC of 1000 cells/mm3 and expected to drop to <500 cells/mm3
D. Patient with temperature of 38.6Â°C and ANC of 400 cells/mm3
Q1 Answer: C Q2 Answer: D

Effectiveness of Angiotensin Receptor-Neprilysin Inhibitors and Sodiumglucose Cotransporter-2 Inhibitors on Readmission Rates in Patients with Heart Failure

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The prevalence of heart failure is projected to increase by 46% from 2012 to 2030. Heart failure is one of the leading causes of hospitalizations and cardiovascular death in the United States. Guideline-directed medical therapy (GDMT) is a mainstay of care and now includes ARNI and SGLT2i therapy as pharmacological treatment. Despite strong evidence and recommendations for their use, we suspect ARNI and SGLT2i are not utilized as frequently as indicated. The aim of this study is to compare rates of cardiovascular death and hospitalizations and identify the utilization rates of ARNI, SGLT2i, and combination therapy in patients with heart failure.

A retrospective chart review was performed to evaluate the usage of ARNI and SGLT2i in the Muskegon and Grand Rapids, Michigan communities. Patients were included if they had a diagnosis of heart failure, a recorded ejection fraction, and a serum creatinine within the prespecified time period. Patients were included if they had Medicare Part D insurance with a medication fill history detected by West Michigan Reporting Services. Patients were excluded if they were pregnant, under 18 years of age, incarcerated, had heart failure with reduced ejection fraction and were not on a beta blocker, or had an allergy to ACEi, ARB, ARNI, or SGLT2i.

The primary objective will identify the composite risk of cardiovascular death or hospitalization for heart failure in the different arms. The secondary objectives will identify the percentage of patients on GDMT (ARNI, SGLT2i, ACEi, ARBs, beta blockers (in patients with preserved ejection fraction), mineralocorticoid receptor antagonists, diuretics, ivabradine, vericiguat, hydralazine and isosorbide), identify the percentage of patients admitted for heart failure (within 30, 60, and 90 days), and identify the total number of hospitalizations within the specified follow-up period.

Summary of results and conclusion: To be determined.

Learning Objectives:

Recognize the difference in reduction of cardiovascular death and heart failure hospitalizations when sacubitril-valsartan is compared to enalapril in a randomized controlled trial.

Identify the benefits of SGLT2i in the heart failure patient population.

Self Assessment Questions:

In PARADIGM-HF, a randomized controlled trial that compared sacubitril-valsartan with enalapril in symptomatic patients with HFrEF tolerating an adequate dose of either ACEi or ARB, sacubitril-valsartan significantly reduced the composite endpoint of cardiovascular death or HF hospitalization by _% relative to enalapril?

A. 0.1
B. 0.12
C. 0.16
D. 0.2

SGLT2i are recommended as GDMT in the HF population because they are associated with which of the following:

A. Reduction in cardiovascular death
B. Reduction in HF hospitalizations
C. Reduction in all-cause mortality
D. All the above

Q1 Answer: D Q2 Answer: D

Health System Standardization of Automatic Dispensing Cabinet Medication Override Lists

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pharmacy. Hospitals utilize ADCs to stock medications as a primary method for delivery and controlling medication distribution. This delivery system has serious implications for asset security and charge capture, turn-around time from pharmacy verification to administration, nursing workflow, and ultimately patient safety. The Institute for Safe Medication Practices (ISMP) recommends organizations limit the variety of medications that can be removed from an ADC using override to only those medications that would be needed emergently to sustain life, or for urgent comfort measures. Use of ADC overrides should be situationally dependent as often there is sufficient time for pharmacist review of medication orders for appropriateness prior to retrieving the dose.

The primary purpose of this project is to establish a system standardized list of medications available from ADCs via override. The secondary purpose is to establish a standard review process for overridden medications across a health system to monitor for order reconciliation, potential medication safety concerns, and systematic reduction of override rates.

This is a pharmacist-led process improvement initiative with oversight by an Omnicell Taskforce comprised of pharmacists, senior technicians, and nurse managers. This committee functions to surveillance ADC related medication errors, metrics, and standardized practice initiatives. Rate of medication overrides organized by system, facility, and item were analyzed to revise override lists to include only medications with legitimate emergent-use indications. September 2022 system override rate was 2.85%; highest override rate 12.37% (Rainbow Babies and Childrenâ€™s Hospital) and lowest override rate 0.91% (Elyria). Override lists for medical surgery, labor and delivery, and intensive care unit (ICU) category ADCs were standardized. Override statistics for each system entity will conduct standard audits in regular cadence with findings reviewed at monthly committee meetings.

Learning Objectives:

Discuss safe use of automated drug cabinets and patient safety related to wrong drug selection and dosing errors associated with ADCs and overrides
Identify areas for process improvement and implementation of best practices to enhance medication safety.

Self Assessment Questions:

ISMP best practice guidelines recommend:

A. All medications stored in ADCs be available via override.
B. Organizations establish criteria for ADC system overrides.
C. Organizations conduct annual audits of ADC system override use.
D. Organizations establish a list of drugs with the potential to be abused.

Strategies that reduce the risk of error when an override is used include all of the following except:

A. Limiting the quantity and number of drug concentrations available.
B. Routinely reviewing override reports to identify and address barriers to the pharmacistâ€™s review of the medication order prior to drug
C. Maximizing storage and use of multi-dose containers.
D. Reviewing and approving all override policies through the P&T Committee, Medication Safety Committee, or their equivalent group.

Q1 Answer: B Q2 Answer: C

Dose Adjustment for Renal Function During Transitions of Care

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Background:

Research suggests pharmacists in transitions of care (TOC) settings can decrease readmission rates and cost of care while improving adherence and patient satisfaction. During the TOC workflow, medication doses are reviewed for renal dose adjustment. The rate of acceptance and clinical benefit of recommendations is unknown.

Objectives:

The primary objective is to analyze the rate of acceptance of renal dose adjustments. The secondary objective is to assess differences in readmissions among the cohort.

Methods:

Patientsâ€™ first TOC call in 2022 was identified through retrospective chart review. Medication doses were reviewed for renal appropriateness, pre- and post-call.

Results:

116 patients were included. 54% of the population was female (n=63). The mean age was 66 years. The mean length of stay was 3.2 days. 28% had Stage 1 CKD (n=33), 35% had Stage 2 (n=40), 16% had Stage 3a (n=19), 7% had Stage 3b (n=8), 7% had Stage 4 (n=8), and 7% had Stage 5 (n=8).
11 patients had potential renal dosing recommendations. 6 were not identified and addressed at the time of the TOC. Among the other 5 recommendations: 3 were accepted by the provider, and 2 were rejected.
In the population without CKD (Stages 1 â€“ 2), there were fifteen 30-day readmissions (20%). Among patients with CKD (Stage 3a â€“ 5), excluding those with potential dose adjustments, there were six readmissions (13%). Among the patients with recommended dose adjustments, there were five 30-day readmissions (42%).

Conclusion:

A third of this population had eGFR<60, but there were few renal dosing recommendations identified. A potential area for improvement is increasing recommendation of renal dose adjustment. During TOC, critical interventions may be identified. This helps explain why a more patient-centered intervention, focusing on the recent admission, may be favored over dosing recommendations.

Learning Objectives:

Describe impact of pharmacists on transitions of care outcomes.
Identify areas for improvement in the transitions of care process.

Self Assessment Questions:

Which of the following has been identified as an outcome of pharmacist-led transitions of care services?

A. Decreased readmission rates
B. Increased readmission rates
C. No difference in outcomes identified
D. Decreased readmission rates and decreased healthcare utilization

Which of the following outcome(s) is negatively impacted by worsening CKD?

A. Readmission rates
B. Cost of care
C. A & B
D. None of the above

Q1 Answer: D Q2 Answer: C

Comparison of Bayesian versus first-order calculations of vancomycin AUC24 in pediatric patients

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Purpose

The 2020 guidelines for the monitoring of intravenous (IV) vancomycin in methicillin-resistant Staphylococcus aureus (MRSA) infections, reflected that the accurate and timely assessment of vancomycin area under the curve (AUC24) is critical for both efficacy and safety. The guidelines recommend targeting a vancomycin AUC24 of 400-600 mg*hour/L in MRSA infections. Olney and colleagues found linear and Bayesian two-concentration methods are comparable to estimate vancomycin AUC24 in adult patients. However in the same study, linear and Bayesian one-concentration estimations showed suboptimal agreement. While this data exists in adult patients, there is little data about the agreement of Bayesian software estimations in comparison to first order equations for vancomycin AUC24 monitoring in pediatric patients. The primary objective of this study is to compare estimated vancomycin AUC24 using first order equations to estimated vancomycin AUC24 using one-concentration Bayesian and two-concentration Bayesian methods in pediatric patients.

Methods

This is a single-center, retrospective cohort study of hospitalized pediatric patients (<18 years) receiving IV vancomycin between 1/1/2020 and 8/20/2022. Patients were included if they received at least 24hr of vancomycin with both peak and trough concentrations obtained in the first 96 hours of vancomycin administration. Patients with baseline renal dysfunction, defined as an estimated creatinine clearance (eCrCl) <35mL/min per 1.73 m2 or dialysis, were excluded. For patients with vancomycin administration in two separate admissions within 30 days of each other, only the first vancomycin administration was included. The Bayesian software utilized to estimate AUC24 will be InsightRXâ„¢.

Results and Conclusions

Over the study period, 411 patients met inclusion criteria with 65% being male and a median age of 5.6 years (0.8-12). Data collection and analysis are ongoing. Preliminary results and conclusions will be presented at the 2023 Great Lakes Residency Conference.

Learning Objectives:

Describe the methods utilized to estimate vancomycin AUC24

Identify how the method of estimating vancomycin AUC24 impacts clinical practice

Self Assessment Questions:

Which of the following methods are recommended by IDSA to monitor efficacy and safety in patients receiving intravenous vancomycin therapy?

A. Peak and trough vancomycin serum concentrations at steady state
B. Vancomycin tough levels only at steady state
C. Bayesian software programs
D. A or C

If vancomycin AUC24 is outside the therapeutic range of 400-600 mg*hour/L, which of the following are potential clinical ramifications?

A. Nephrotoxicity
B. Treatment failure
C. Emergence of resistance
D. All the above

Q1 Answer: D Q2 Answer: D

Evaluating Emergency Department Broad Spectrum Antibiotic Use: An Analysis of Changes Made to Antibiotic Therapy within 24 Hours of Hospital Admission

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Purpose: The purpose of this study is to evaluate trends in prescribing within the emergency department and changes to antimicrobial therapy in the first 24 hours of hospital admission. The goal is to curate recommendations to reduce the overuse of broad spectrum antibiotics in the emergency department and associated bacterial resistance and negative patient outcomes.
Methods: A retrospective chart review is being conducted on patients who received intravenous (IV) antibiotics in the emergency department ordered from the â€œED Adult Sepsis Treatmentâ€ order set between January 1, 2020 and December 31, 2021. Those included in the study are patients 18 years or older that received at least one dose of IV antibiotics in the emergency department as part of the sepsis order set. Patients that received antibiotics for surgical prophylaxis only are excluded. The primary outcome measure is the percentage of patients whose antimicrobial therapy was de-escalated, escalated, or unchanged within 24 hours of hospital admission. Secondary outcomes being evaluated are 30-day mortality rate, Clostridioides difficile infection rate, length of ICU and hospital stay, source of infection, diagnosis at admission vs discharge, duration of IV antibiotic therapy, QSOFA and SIRS score at time of first antibiotic administration, and CMS status effect on antibiotic selection. Secondary outcomes are comparative to primary outcomes groups (de-escalated, escalated, unchanged).
Results: Data is currently being collected. Results will be presented at Great Lakes Pharmacy Resident Conference in April 2023.
Conclusions: Data is currently being collected. Conclusions based on results will be presented at Great Lakes Pharmacy Resident Conference in April 2023.

Learning Objectives:

Outline the 2021 updates to the Surviving Sepsis Campaign.
Describe negative outcomes associated with the overuse of broad-spectrum antibiotics.

Self Assessment Questions:

A patient presents to the emergency department with sepsis without shock present. Per Surviving Sepsis Campaign 2021 recommendations, antibiotics should be administered within what time frame?

A. As soon as possible (less than 30 minutes)
B. 1 hour
C. 3 hours
D. 24 hours

Which of the following is a negative outcome seen with the overuse of broad-spectrum antibiotics?

A. Clostridioides difficile infection
B. Increased costs
C. Antibiotic resistance
D. All of the above

Q1 Answer: C Q2 Answer: D

Comparison of Three Models for Predicting Drug Resistant Pathogens in Patients with Community-acquired Pneumonia in a Community Hospital

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Previous Infectious Disease Society of America (IDSA) guidelines recommended extended-spectrum antibiotics for cases of pneumonia that met healthcare-associated pneumonia criteria. In 2016, the IDSA abandoned the use of these criteria due to its limited predictability of drug resistant pathogens. Current recommendations for predicting drug resistant pathogens encourage utilization of locally validated risk factors. Two prediction models recently gained popularity: Drug Resistance in Pneumonia (DRIP) score and Shindo score. The objective of this study is to determine if HCAP, DRIP or Shindo score most accurately predicts drug resistant pathogens in patients hospitalized with community-acquired pneumonia at Baptist Health Floyd. This study was approved by the Institutional Review Board. The single center, retrospective chart review included 232 patients admitted to Baptist Health Floyd between January 1, 2021 and December 31, 2021 who were diagnosed with CAP and had a resulted microbiological culture within two days of admission. Patients were identified using ICD-10 code(s) for community-acquired pneumonia. Drug resistant pathogens are defined by resistance to regimens recommended for the treatment of CAP. Risk factor data for the admission was collected from the patientâ€™s electronic medical record. An individual score was calculated for each of the three prediction models. Cases were classified as high- or low-risk per the respective modelâ€™s score and microbiologic results were compared to the classifications to determine the accuracy for each case. Risk classifications for each predication model were utilized to calculate the models performance. The primary outcome is the area under the receiver operator curve for each prediction model. Results to be presented at Great Lakes Conference.

Learning Objectives:

Define Community-acquired pneumonia due to drug resistant pathogens (CAP-DRP)
Identify Risk factors of drug resistant pathogens in community-acquired pneumonia recognized by the HCAP, DRIP, or Shindo prediction models

Self Assessment Questions:

In community-acquired pneumonia, a drug resistant pathogen is defined by:

A. Resistance to either ceftriaxone or levofloxacin
B. Resistance to either azithromycin or levofloxacin
C. Resistance to either ceftriaxone, azithromycin or levofloxacin
D. Resistance to ceftriaxone, azithromycin, and levofloxacin

Which of the following is a risk factor for drug resistant pathogens in community-acquired pneumonia?
A. Antibiotic therapy in the preceding 60-90 days
B. Ambulatory status
C. History of MRSA isolation or colonization 2 years ago
D. Past medical history of cirrhosis
Q1 Answer: C Q2 Answer: A

Evaluation of the Effectiveness and Safety of Two Alteplase Dosing Strategies for the Treatment of Pulmonary Embolism

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Acute pulmonary embolism (PE) requires prompt intervention potentially including use of thrombolytics and therapeutic anticoagulation. This study evaluated the effectiveness and safety of two intravenous (IV) alteplase dosing strategies for massive and submassive PE. This retrospective, multicenter, single health system study included patients age â‰¥ 18 years admitted for â‰¥ 24 hours who received alteplase 50mg (HD) vs 100mg (FD) for confirmed acute PE from 1/2015-12/2021. Effectiveness outcomes included need for composite treatment escalation and time to blood pressure (BP) > 90mmHg. Safety outcomes included major bleeding and in-hospital mortality. A subgroup analysis evaluated overall adherence to an IV heparin protocol post-alteplase. Data was analyzed with SPSS v.29.0.0.0 (241). Of 576 evaluated, 209 patients (125 HD, 84 FD) met inclusion criteria. Patient characteristics were similar between groups, with a mean age of 60Â±14 years, 48% male, and APACHE II of 11Â±7 overall. FD tended to have more massive PE diagnoses (35%FD vs 22%HD, p=0.05) and hypotension at the time of alteplase administration (32%FD vs 17%HD, p=0.01). Composite treatment escalation was more common with FD (20%FD vs 8%HD, p=0.01). Although not significant, time to BP > 90mmHg appeared shorter in FD (8[2.4,36]FD vs 22[9,49]HD, hours, p=0.41). Major bleeding occurred more with FD (43%FD vs 30%HD, p=0.04). In-hospital mortality was similar between groups (p=0.67). The subgroup analysis included 16 patients. Overall protocol adherence was 75%, with three cases of non-adherence due to incorrectly drawn post-alteplase aPTTs. In the treatment of massive and submassive PE, a higher composite escalation and increased major bleeding were observed with FD vs HD. Time to BP stability was not different between groups. Treatment escalation in FD alteplase may have been required due to the burden and severity of PE. The subgroup analysis identified that additional education on post-alteplase aPTT collection is required to achieve 100% protocol adherence.

Learning Objectives:
Identify risk classification for pulmonary embolism by evaluating clinical criteria
Recognize alteplase dosing strategies for pulmonary embolism

Self Assessment Questions:
A patient presents to the emergency department with complaints of sudden onset dyspnea, cough, and blood-tinged sputum after a recent overseas business trip. Suspecting the presence of a pulmonary embolism, a bedside echocardiogram is performed and reveals right heart strain prompting further investigation with a CT scan. The radiologist confirms the presence of bilateral subsegmental pulmonary emboli. Vitals: HR 105, BP 82/56 mmHg, T 99.5 F, RR 20. Labs: d-dimer 560 ng/mL. How would you classify the severity of this patientâ€™s pulmonary embolism?
A. High risk
B. Intermediate-high risk
C. Intermediate-low risk
D. Low risk
A patient (90 kg) presents with massive pulmonary embolism not in cardiac arrest. Which of the following dosing strategies is correct?
A. 8.1 mg IV bolus, 72.9 mg IV infusion over 1 hour
B. 100 mg IV bolus over 2 minutes
C. 50 mg IV bolus over 2 minutes
D. 100 mg IV infusion over 2 hours
Q1 Answer: A Q2 Answer: D

Analyzing the Future of Anticoagulation Clinics: Are Clinics Bleeding Out the Budgets of Health Care Systems?

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Anticoagulation therapy is essential for patients who have increased risk of thrombosis due to conditions such as a venous thromboembolism (VTE), atrial fibrillation, or a heart valve replacement. Among available options for orally administered anticoagulants (e.g., direct-acting oral anticoagulants [DOACs], warfarin), warfarin remains a common therapy for select patients because of the cost barrier of other alternatives. Anticoagulation clinics are advantageous in the management of warfarin for both patients and health care facilities with improved time in the therapeutic INR range compared to provider-managed therapy, which decreases future complications and hospitalization rates. However, anticoagulation clinics are decreasing in prevalence due to less frequent prescribing of warfarin in favor of DOACs, a less closely monitored therapy. As a result, lower clinic census presents budgetary challenges for health care facilities responsible for operating these clinics. This project aims to highlight opportunities and obstacles for anticoagulation clinics while identifying and delineating potential ways to make these clinics profitable. Themes that will be discussed include staffing strategies, daily patient load management, and changes to patient follow-up intervals.

Learning Objectives:

Describe shared opportunities and obstacles commonly experienced by anticoagulation clinics.

Identify potential strategies to enhance anticoagulation clinic profitability.

Self Assessment Questions:

Which of the following patients would be eligible and most appropriate to switch from warfarin to a DOAC?

A. 67-year-old female with past medical history of aortic stenosis, heart failure, and COPD with a mechanical mitral valve replacement.

B. 56-year-old male with past medical history of dyslipidemia, hypertension, DVT (10+ years ago), and activated protein C resistance (APCR).

C. 59-year-old male with past medical history of asthma, DM, dyslipidemia, and atrial fibrillation.

D. 72-year-old male with past medical history of DM, atrial fibrillation, and ESRD

To successfully switch the patient above from warfarin to a DOAC, which of the following actions are most appropriate?

A. Send the prescription for the DOAC, verify insurance coverage and cost, verify with patient they can pick it up, instruct patient when to stop warfarin and start DOAC, provide patient education, follow up with patient in one week to see how the patient is doing

B. Send the prescription for the DOAC using a free 30-day trial card, instruct patient when to stop warfarin and start DOAC, follow up with patient in one week to see how the patient is doing

C. Send the prescription for the DOAC and follow up with patient in one week to see how the patient is doing

D. Send the prescription for the DOAC, instruct patient when to stop warfarin and start DOAC, provide patient education, follow up with patient in one week to see how the patient is doing

Q1 Answer: C Q2 Answer: A

Implementation of a Pharmacist-led Penicillin Allergy Interview at a Veteranâ€™s Care Facility

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The purpose of this project is to evaluate the impact of a pharmacist-led penicillin allergy initiative on penicillin allergy de-labeling with an interview process alone. According to guidelines from the Center for Disease Control and Prevention (CDC), evaluating a patient who reports a penicillin, or another Î²-lactam antibiotic allergy, involves three steps: obtaining a thorough medical history, performing a penicillin skin test, and for those with a negative skin test, performing an observed oral challenge before proceeding directly to treatment with the indicated Î²-lactam therapy. The Allergy to Beta Lactam (ABLE) process will be utilized to clear penicillin allergies off patient profiles through a standardized interview, workflow, and note template.

Methods:

This is a single-facility, retrospective cohort study completed by chart reviews of Computerized Patient Record System (CPRS) notes from the Robley Rex Veterans Affairs Medical Center (VAMC). Pharmacist-driven penicillin allergy interviews were conducted for patients meeting inclusion criteria, which include hospitalized adult patients with a documented penicillin allergy or adverse drug reaction (ADR). Guidance from the ABLE process , along with clinical judgement and chart review, will be used in order to determine if a patient is eligible for allergy update or removal and/or switch to a Î²-lactam antibiotic. Templated progress notes with patient-specific recommendations will then be entered into CPRS. Interviewed patients will be compared to a historical control group and matched for penicillin allergy severity [allergy (IgE mediated), unknown, side effect, severe cutaneous or other non-IgE mediated reaction]. The primary outcome is the number of patientâ€™s allergy/ADR removed/changed on profile. Secondary outcomes (for all patients on non-carbapenem non-Î²-lactam antibiotics) include the number of patients with a reported penicillin allergy changed to a Î²-lactam antibiotic, hospital length of stay, allergic reaction incidence, Clostridioides difficile incidence, all-cause 30-day mortality, all-cause 30-day readmission, and infection-related 30-day readmission.

Results/Conclusions: Pending.

Learning Objectives:

Relate the steps required to evaluate patients with a penicillin allergy per CDC guidance with this study protocol.

Discuss the ABLE process and review the various penicillin allergy reaction types including recognizing their severities.

Self Assessment Questions:

Which of the following step(s) based on CDC guidance for penicillin allergy evaluation is/are being omitted in our retrospective cohort study?

A. Thorough medication history
B. Penicillin skin test
C. Oral challenge
D. Both B & C

Based on the ABLE reminder dialogue template in CPRS, which of the following penicillin reaction types will allow for a change in penicillin allergy documentation in the electronic health record?

A. Allergy
B. Unknown reaction in childhood or adulthood
C. Side effect
D. Severe cutaneous adverse reaction (SCAR) or other non-IgE-mediated allergic reaction

Q1 Answer: D Q2 Answer: C

Double Strength versus Single Strength Bactrim for Prophylaxis of Urinary Tract Infections in Kidney Transplant Recipients

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Purpose: Urinary tract infections (UTI) are a common complication in the first 6-months post-kidney transplant. Current guidelines recommend UTI prophylaxis with sulfamethoxazole-trimethoprim (SMX-TMP) for at least 1-month, but do not specify optimal dosing with SMX-TMP DS (800-160mg) vs SS (400-80mg). In November 2021, the study institution revised its protocol to use SMX-TMP DS instead of SS for 6-months post-transplant due to an observed increase in UTIs. Safety concerns with using higher dosing include hyperkalemia, leukopenia, and increased serum creatinine. This single-center study compared the efficacy and safety of SMX-TMP DS vs SS for UTI prophylaxis in the first 6-months post-transplant.

Methods: Adult kidney transplant recipients from 12/1/20-5/1/21 (SS-group) and 12/1/21-05/1/22 (DS-group) were included. The primary outcome was comparative incidence of UTI (positive urine culture with >100,000 CFU and pyuria >10 WBC, or any treated UTI). Secondary outcomes included comparative rate of SMX-TMP discontinuation (dose held >14 days) and reason, initiation of alternative UTI prophylaxis if discontinued, patients on prophylaxis at UTI diagnosis, time to first UTI, inpatient treatment of UTI, presence of ureteral stent at UTI diagnosis, and time to stent removal from transplant.

Results: A total of 185 patients were included (DS-group n=95, SS-group n=90). Baseline characteristics were similar between groups. There was no difference in UTI incidence at 6-months (29.5% DS-group, 30% SS-group, P=0.938). Discontinuation for adverse events was significantly higher in the DS-group (69.5% vs 36.7%, P<0.001). More patients in the DS-group were started on alternative prophylaxis upon discontinuation (56.1% vs 18.2%, P<0.001), however patients receiving prophylaxis at UTI diagnosis was similar (82.9% vs 76.5%, P=0.510). There was no difference in presence of stent at UTI diagnosis or inpatient treatment.

Conclusions: Use of SMX-TMP DS vs SS did not reduce UTI incidence within 6-months post-kidney transplant and was associated with a higher discontinuation-rate due to adverse events.

Learning Objectives:

Review current AST guideline recommendations and literature for the appropriate use of SMX-TMP for UTI prophylaxis in kidney transplant recipients
Discuss the efficacy and safety of SMX-TMP DS vs SMX-TMP SS for UTI prophylaxis

Self Assessment Questions:

Per the AST guidelines, what is the recommended dosing for SMX-TMP in kidney transplant patients for UTI prophylaxis?

A. SMX-TMP SS (400-80 mg)
B. SMX-TMP DS (800-160 mg)
C. There is no recommended dose for the use of SMX-TMP
D. D.S SMX-TMP is not recommended for UTI prophylaxis

Which of the following adverse events can occur in patients taking SMX-TMP?

A. Hyperkalemia
B. Leukopenia
C. Acute Kidney Injury
D. All of the above

Q1 Answer: C Q2 Answer: D

Patient Outcomes on Short-Term Warfarin versus Continued Direct Oral Anticoagulants after Orthopedic Surgery

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Purpose: There is a risk for venous thromboembolism after orthopedic joint replacement surgery. Patients at a high risk for developing a thromboembolism may be prescribed anticoagulation for a short period after surgery or have their anticoagulation continued if they were on it previously. At Bronson, some patients requiring VTE prophylaxis after orthopedic surgery are prescribed warfarin for 30 days. Many of these patients are switched from the direct oral anticoagulant (DOAC) they were on previously. Using warfarin requires the patient to frequently come in to the anticoagulation clinic for dosing and causes delays in reaching therapeutic levels of anticoagulation. There is concern that this may result in high rates of DVT, stroke, and bleeding in patients compared to other oral anticoagulants that do not require frequent monitoring. The objective of this study is to compare outcomes between patients continued on their home DOAC to those switched to warfarin during the postoperative period.

Methods: This study is a retrospective chart review of patients receiving a DOAC or warfarin after total hip arthroplasty (THA) or total knee arthroplasty (TKA). Patients were divided into two groups: those on a DOAC prior to surgery being continued on their DOAC and those on a DOAC prior to surgery that were then switched to warfarin postoperatively. The primary outcome is the rates of symptomatic VTE within the 30-day postoperative period. Secondary endpoints analyzed stroke, rates of major bleeding, minor bleeding, and wound dehiscence at the surgical site. For patients on warfarin, the percent of time with a therapeutic INR was also analyzed.

Results/conclusions: Data collection and analysis are currently being performed. Results and conclusions will be presented at the 2023 Great Lakes Pharmacy Resident Conference.

Learning Objectives:
Identify the major risk factors for venous thromboemoblism in the postsurgical period.
Describe barriers to reaching therapeutic INR target when initiating warfarin for anticoagulation versus a DOAC.
Self Assessment Questions:
Based on the CHEST guidelines, which of the following anticoagulation methods is preferred for VTE prevention in someone undergoing TKA or THA?
A. Rivaroxaban 20mg PO daily
B. Enoxaparin 40mg subcutaneously daily
C. Aspirin 81mg daily
D. Heparin 5000 units subcutaneously Q8H
2. Which one of these is not a recommended method to reduce risk of VTE after orthopedic surgery?
A. Bed rest
B. Sequential compression devices
C. Early ambulation
D. Anticoagulation
Q1 Answer: B Q2 Answer: A

Evaluation of Oral versus Intravenous Phosphorus Dosing Efficacy in a Community Teaching Hospital
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Purpose: Phosphorus is an essential mineral necessary for many physiological functions including neurological processes, bone growth, and energy production. Hypophosphatemia is a common metabolic abnormality in hospitalized patients and is associated with poor clinical outcomes. Hypophosphatemia is caused by inadequate dietary intake, impaired absorption, excessive renal excretion, or redistribution of phosphorus supply, as seen in refeeding syndrome and diabetic ketoacidosis. Current phosphorus replacement dosing strategies are dependent on serum phosphorus levels and body weight. Replacement may occur via enteral or parenteral routes, with parenteral replacement recommended for patients with a critically low phosphorus level. This study aims to evaluate the efficacy of current parenteral and enteral dosing strategies for phosphorus replacement therapy.
Methods: This was a single-center, retrospective study. Patients who received phosphorus replacement between April 1, 2021 and October 1, 2022 were randomized and categorized based on route of administration. Data was collected until 100 patients were included in each the enteral and the parenteral replacement groups. Patients meeting the following criteria were excluded: less than 18 years old, pregnant, lack of post-replacement serum phosphorus level, receiving parenteral nutrition, diagnosed with diabetic ketoacidosis, glomerular filtration rate less than 30 ml/min, or end-stage renal disease with dialysis or continuous renal replacement therapy. The primary outcome was the percentage of patients who achieved a therapeutic phosphorus level after initial supplementation. Secondary outcomes included time to therapeutic phosphorus level, mean daily dose, number of replacement doses to goal phosphorus level, hyperkalemia, and hyperphosphatemia. Descriptive statistics were used to analyze data.
Results and Conclusion: Results and conclusions will be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:
Identify factors that contribute to the development of hypophosphatemia
Describe differences between enteral and parenteral routes of phosphorus replacement
Self Assessment Questions:
Which of the following conditions increases the risk of hypophosphatemia?
A. Diabetic ketoacidosis

B. Pneumonia
C. Hypertension
D. Atrial fibrillation
Which of the following is a benefit of parenteral phosphorus compared to enteral replacement?
A. Less preparation requirements
B. Lower drug costs
C. Faster onset of action
D. Easier administration for nursing staff
Q1 Answer: A Q2 Answer: C

DOOR's Wide Open for Eravacycline in Severe/Fulminant C. difficile Infections

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outcomes. Synthetic tetracyclines, such as eravacycline, have been utilized in patients with recurrent, severe, or fulminant CDI due to their in vitro activity against most strains of C. difficile. While in vitro studies have shown eravacyclineâ€™s potential use in CDI, there has not been a direct comparison of outcomes comparing the use of adjunct eravacycline to the standard of care. The purpose of this study was to evaluate outcomes with the utilization of oral vancomycin plus IV eravacycline compared to oral vancomycin with/without IV metronidazole for treatment of severe, refractory, or fulminant C. difficile infections.

Methods: This was an IRB approved, retrospective cohort study of adult patients hospitalized for severe, refractory, or fulminant CDI from 6/2019-9/2022. To meet eligibility for inclusion, patients were required to be outcome free for 72-hours and receive treatment with either regimen for >48-hours. Patients were excluded if they had non-severe CDI, care was withdrawn within 72-hours of treatment completion or received <48-hours of treatment. Patients were compared by therapy received: oral vancomycin with eravacycline or oral vancomycin +/- metronidazole. The primary outcome was analyzed using a Desirability of Outcome Ranking (DOOR) of clinical cure, recurrence or refractory CDI, escalation of care, and CDI-related mortality. Patients with refractory CDI were assessed using blinded adjudication by at least two content experts from the study team. A third study member expert adjudicated to break a tie if needed. Due to anticipated differences in patient characteristics between treatment groups, propensity score matching (PSM) was planned a priori and was performed with a 1:1 ratio using a greedy nearest neighbor algorithm and caliper width of 0.2 standard deviations.

Results and Conclusion: Results to be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe Characteristics and treatment among patients with severe, refractory, or fulminant Clostridioides difficile infections (CDI)
Identify The clinical utility and place in therapy of eravacycline for the treatment of Clostridioides difficile infections

Self Assessment Questions:

Which of the following patient characteristics would NOT qualify a patient for escalation from the standard of care treatment for severe Clostridioides difficile infections (CDI)?
A. Serum Creatine â‰¥ 1.5mg/dL
B. Leukocytes > 15,000 cells/m3
C. Age < 60 and hyperalbuminemia
D. Previous treatment of CDI and ongoing immunosuppression
What is eravacyclineâ€™s role in therapy for the treatment of Clostridioides difficile infections?
A. Targeted therapy against non-CDI, intra-abdominal microbes in confirmed CDI infections
B. In response to non-specific clinical symptoms of severe, refractory, or fulminant CDI without ribotype testing
C. When patients demonstrate mild abdominal distension with or without clinically diagnosed CDI
D. If a patient recently completed a course of antimicrobials consisting of any agents from the NHSN list and has at least one episode of loose stool at any point in therapy
Q1 Answer: C Q2 Answer: B

Evaluation of Rural and Urban Medication Adherence in an Integrated Health System Pharmacy Enterprise

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Background: Medication nonadherence is a modifiable risk factor of poor health, occurring in approximately 60% of the population with chronic diseases. Nonadherence is a multi-factorial phenomenon, caused by clinical and social determinants of health. Patients with rural residence with historical disparities in social infrastructure, socioeconomic status, education, and insurance coverage may be disproportionately at risk for nonadherence compared to urban counterparts.

Statement of Purpose: To evaluate if disparities exist in medication adherence between rural and urban patients served by an Integrated Health System Pharmacy (IHSP) enterprise.

Methods: Retrospective cohort study of patients receiving medications from five IHSP locations from January 1, 2019 through December 31, 2021. Included patients filled a chronic medication from an investigator-determined list of chronic medications within the study period. Patients were cohorted by rural residence using a Rural Urban Commuting Area (RUCA) code definition (RUCA â‰¥ 7 indicating rurality). Adherence was calculated at the patient-level using Proportion of Days Covered (PDC; PDC â‰¥ 80% considered adherent). A stepwise, backward-elimination, fit-binary logistic regression model was constructed to assess the relationship between medication adherence and explanatory variables.

Results: 14,249 patients were included, with 1,012 (7.1%) classified as rural residents. No statistically significant difference was observed between rural and urban patients in medication adherence. Age (OR 1.015 per year; 95% CI [1.013-1.017]), first medication fill occurring after the COVID-19 pandemic (OR 1.28; [1.18-1.39]), and fills at a specialty pharmacy location (OR 1.70 [1.44-1.99]) were associated with significantly increased odds of adherence. Statistically significant lower odds of adherence occurred with a higher number of prescriptions filled (OR 0.952; [0.923-0.982]), higher socioeconomic risk (OR 1.28; [1.18-1.39]), and prescription fills of stimulant, pain, and mental health medications (OR 0.81; [0.69-0.95]). The results suggest rural patients are overall underrepresented, but there are predictors independent of rurality for nonadherence with potential for future focus.

Learning Objectives:

Discuss Patient assessment tools to identify barriers to care

Describe Methods of characterizing rural areas

Self Assessment Questions:

Which of the following is one of the four domains of the social vulnerability index score?

A. Gender RIsk

B. Racial Risk

C. Economic Risk

D. Financial Risk

A RUCA code greater than __ indicates small town or rural areas

A. 2

B. 5

C. 9

D. 7

Q1 Answer: B Q2 Answer: D

Analysis of the 2-Bag Method for the Management of Diabetic Ketoacidosis: A Retrospective Before and After Study

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diabetic ketoacidosis (DKA). We hypothesize that the two-bag method will decrease the incidence of hypoglycemia in patients admitted for DKA, when compared to the one-bag method.

Methods: A before-and-after chart review was done on patients admitted for DKA to a Trinity Health Michigan institution between 2020 and 2022. A total of 1,084 adult patients were included, with 842 patients treated with the one-bag method and 242 patients treated with the two-bag method. The primary outcome was incidence of hypoglycemia. Secondary outcomes included time to closure of anion gap, time on an insulin infusion, time to bicarbonate correction, and incidence of hypokalemia.

Results: The incidence of hypoglycemia was 38% in the one-bag group compared to 15.83% in the two-bag group ($p < 0.001$). Patients in the two-bag group had a shorter infusion duration compared with the one-bag group (22.17 hours vs 28.37 hours, $p < 0.001$). There was no statistical between-group difference in rates of hypokalemia, but there was a trend towards lower rates in the two-bag (60% vs 66.39%, $p = 0.079$). Patients in the two-bag group had a faster time to anion gap closure (8.52 hours vs 8.99 hours, $p = 0.021$) and a faster time to bicarbonate correction (10.69 hours vs 10.88 hours, $p = 0.004$).

Conclusions: The two-bag method for the treatment of DKA resulted in fewer hypoglycemic incidences, a shorter infusion duration, and faster time to anion gap closure and bicarbonate correction. Rates of hypokalemia were similar between groups. This study demonstrates that, in adults, the two-bag method for DKA may be safer and more effective than the one-bag method.

Learning Objectives:

Describe the two one- and two-bag methods used for the treatment of DKA
Identify key complications associated with the treatment of DKA

Self Assessment Questions:

Which of the following is a key difference between the one- and two-bag methods for DKA?
A. In the two-bag method, dextrose (D10) is infused separately from the bag containing fluids/electrolytes
B. In the one-bag method, dextrose (D10) is infused separately from the bag containing fluids/electrolytes
C. In the two-bag method, electrolytes are added to the insulin bag
D. In the one-bag method, electrolytes are added to the insulin bag

Which of the following is a potential complication associated with the treatment of DKA?
A. Hyperkalemia
B. Hypoglycemia
C. Hypokalemia
D. None of the above

Q1 Answer: A Q2 Answer: C

Impact of anticoagulation reversal with 4F-PCC for acute gastrointestinal bleeding in patients on anticoagulation

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Background: Approximately 40% of all oral anticoagulant-associated major bleeding episodes are of gastrointestinal origin. Reversal of anticoagulation is recommended for bleeds that are major or that occur in a critical site. The International Society on Thrombosis and Hemostasis (ISTH) defines critical sites as intracranial, intraspinal, intraocular, retroperitoneal, intra-articular, pericardial, or intramuscular with compartment syndrome. Despite not being recognized as a critical bleeding site, patients with gastrointestinal bleeding frequently receive anticoagulation reversal products. Four-factor prothrombin complex concentrate (4F-PCC) is FDA-approved for reversal of warfarin and is used off-label for reversal of direct oral anticoagulants (DOACs). Anticoagulation reversal carries a risk for thrombotic and thromboembolic events. Appropriate risk-stratification of patients is imperative to optimize the benefit while minimizing potential risk associated with anticoagulation reversal.
Statement of purpose: Assess the impact of 4F-PCC on relevant clinical outcomes in patients with a diagnosis of gastrointestinal bleed maintained on enteral anticoagulation.
Methods: This is a retrospective, multi-center cohort study assessing adult patients admitted to Trinity Health Western Michigan hospitals between March 1, 2020, and July 31, 2022. Patients with a discharge diagnosis of a gastrointestinal bleed will be screened for inclusion. Concurrent diagnosis of cirrhosis using ICD-10 codes, multiple bleeding sites, trauma-induced gastrointestinal bleeding, and mortality within 24 hours of admission will result in exclusion. The primary endpoint is incidence of hemodynamic instability within 24 hours of gastrointestinal bleed presentation evaluating patients who received and did not receive anticoagulation reversal with 4F-PCC. Hemodynamic instability is defined as vasopressor requirement or having systolic blood pressure < 90 mmHg with or without a heart rate > 100 beats per minute. Secondary endpoints include 30-day readmission for bleeding or thrombotic events, total blood products administered, hospital length of stay, and costs associated with anticoagulation reversal.
Data is currently being collected, and results will be presented at the conference.

Learning Objectives:

Indicate the severity of bleeding using criteria per the International Society on Thrombosis and Haemostasis.
Identify FDA labeled indications for 4F-PCC.

Self Assessment Questions:

Using the ISTH definition of major bleeding, which site is considered a critical site?
A. Intramuscular
B. Gastrointestinal
C. Intracranial
D. Oropharyngeal

Which anticoagulant is FDA-approved to be reversed with 4F-PCC?
A. Apixaban
B. Warfarin
C. Dabigatran
D. Rivaroxaban

Q1 Answer: C Q2 Answer: B

Impact of Multiplex Respiratory PCR on Antimicrobial Stewardship and Infection Control in the Emergency Department and Inpatient Settings

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Purpose:
Respiratory tract infections are frequent causes of emergency department visits and hospitalization. Many healthcare teams utilize rapid, multiplex polymerase chain reaction (PCR) point-of-care tests to detect or rule out infectious pathogens. Each test differs by pathogens detectable, turnaround time, and cost. It is not well understood how results impact clinical decision-making in the emergency department or acute care settings. Multiple studies have assessed the impact of multiplex respiratory PCR implementation and identified significant variation in antimicrobial stewardship and prescribing. However, most literature was published before the emergence of SARS-CoV-2 when utilization of these tests immensely increased in healthcare settings. The purpose of this study was to assess the impact of multiplex respiratory PCR results on antimicrobial stewardship, infection control, and patient outcomes for adults tested in the emergency department and discharged to the inpatient setting or home.
Methods:
This retrospective cohort study was approved by the Institutional Review Board. The primary objective of this study was to determine the proportion of patients who had an appropriate antibiotic decision made within 24 hours of a positive respiratory PCR. Secondary objectives included evaluating risk factors for inappropriate antibiotic use and assessing impact of test results on infection control precautions. Adult patients were included if they had a positive multiplex respiratory PCR test. Patients were excluded if their test was positive for SARS-CoV-2 or performed greater than 24 hours after arrival. Patients were also excluded if they were not experiencing respiratory symptoms, transferred from an outside institution, or were on antibiotic therapy prior to admission.
Results/Conclusion:
Data collection and analysis are ongoing. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.
Learning Objectives:
Describe the turnaround time and pathogens detectable by common multiplex upper respiratory PCR panels.
Recall the strengths and limitations of previously published literature on multiplex respiratory PCR and its impact on antimicrobial use.
Self Assessment Questions:
Which of the following matches the capabilities of a multiplex upper respiratory PCR panel?
A. Detects Chlamydia pneumoniae in 30 minutes
B. Detects influenza A or B virus in 45 minutes
C. Detects SARS-CoV-2 in 30 minutes
D. Detects Staphylococcus aureus in 45 minutes
Which of the following describes previous multiplex respiratory PCR literature?
A. Most studies were completed after the COVID-19 pandemic
B. Studies equally included acute care and ED patients
C. Most studies were done when RVP turnaround time was slower
D. Studies focused on how RVP results impacted infection control precautions
Q1 Answer: B Q2 Answer: C

Analysis of the rate of clinical pharmacist intervention in patients taking direct oral anticoagulants
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PURPOSE: Direct oral anticoagulants (DOACs) offer an alternative to warfarin, requiring less monitoring, less drug interactions, and more predictability. However, DOACs may cause significant bleeding and are classified as â€œhigh-alertâ€medications by the Institute for Safe Medication Practices (ISMP). Therefore, medication management by a healthcare professional is essential to reduce the risk of bleeding events and monitor safety parameters. Currently, the UW Health Northern Illinoisâ€™s (UWNI) Anticoagulation Clinic is led by pharmacists who systematically per protocol monitor patients on a DOAC at baseline, 1 month, and 6 months. At each telephone follow-up, pharmacists assess monitoring parameters such as lab monitoring, dose and indication, bleeding events, and drug interactions. If interventions, defined as dose adjustment or cessation of DOAC were required, pharmacist would appropriately address. The purpose of this study is to retrospectively measure pharmacist follow-up workflow to improve efficiency of capturing patients on a DOAC to optimize patient safety.
METHODS: This was a retrospective quality improvement, single-center chart review. Patients were identified using excel generated reports of adults â‰¥ 18 years old who are diagnosed with non-valvular atrial fibrillation or venous thromboembolism and are on a DOAC. Patients were excluded if they were Ë, 18 years old, â‰¥ 90 years old, or were on a DOAC following surgery for short-term DVT/PE prophylaxis. The primary outcome was identified as the percentage of patients who had an adherence to protocol telephone follow-up with a pharmacist from baseline to 6 months. The secondary outcomes were percentage of interventions made by a pharmacist.
CONCLUSION: Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference 2023.
Learning Objectives:
Discuss FDA approved indications for DOACs
Identify opportunities for ambulatory pharmacists to optimize DOAC prescribing and monitoring parameters
Self Assessment Questions:
Which of the following is correct?
A. DOACs are indicated for use in treatment of nonvalvular atrial fibrillation

B. DOACs are indicated for use in treatment of valvular atrial fibrillation
C. DOACs are indicated in pregnant women when treated for venous thromboembolism
D. DOACs are indicated for use in treatment of antiphospholipid syndrome

What opportunities are there for ambulatory pharmacist to optimize DOAC prescribing and monitoring parameters?
A. Identify and address lab abnormalities
B. Identify drug-drug interactions and make dose recommendations
C. Verify appropriate dose and indication
D. All the above

Q1 Answer: A Q2 Answer: D

Retrospective analysis of opportunities to convert from warfarin to a DOAC for chronic anticoagulation therapy

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Purpose: Clinical practice guidelines recommend direct oral anticoagulants (DOACs) over warfarin for anticoagulation therapy in eligible patients due to their efficacy, safety, and ease of use. Despite their advantages, there are still barriers to prescribing DOACs, including cost to the patient, periprocederal management, non-adherence, dosing errors, and drug interactions. In these situations, a clinical pharmacist can be a valuable asset to overcome these barriers. The purpose of this study is to quantify opportunities for conversion from warfarin to a DOAC in order to assist with the development of new pharmacy services for anticoagulation therapy management.

Methods: This study is designed to be a retrospective chart review. The primary objective of this study is to quantify the proportion of chronic anticoagulation patients treated with warfarin who are candidates for conversion to DOAC therapy. Key secondary objectives are to quantify time in therapeutic range (TTR) on warfarin, describe barriers for conversion to DOAC therapy, and quantify adverse events on warfarin, including major and clinically relevant non-major bleeding, critical international normalized ratios (INRs), hospitalizations, and thromboembolic events. Patients will be identified based upon reports of TTR on warfarin therapy between 8/1/2021 and 8/1/2022. Patients will be eligible for inclusion if they are greater than or equal to 18 years of age on chronic warfarin therapy for atrial fibrillation, venous thromboembolism (VTE), or pulmonary embolism (PE) treatment or prevention with a TTR less than or equal to 65%. Key exclusion criteria include patients who do not have an indefinite anticipated duration of anticoagulation therapy, patients with a mechanical heart valve or left ventricular assist device (LVAD), patients with valvular atrial fibrillation or antiphospholipid syndrome, deceased patients, incarcerated individuals, and pregnant patients. The results of this study will be analyzed using descriptive statistics.

Results and Conclusion: to be presented at Great Lakes Pharmacy Resident Conference

Learning Objectives:

Recall clinical practice guidelines recommendations for anticoagulation therapy for non-valvular atrial fibrillation and treatment of venous thromboembolism
Recognize common contraindications to DOAC therapy

Self Assessment Questions:

Which of the following is a contraindication to DOAC therapy?
A. Presence of a bioprosthetic valve
B. Triple positive antiphospholipid syndrome
C. Mild aortic stenosis
D. Aortic root dilation

The ACC/AHA clinical practice guidelines recommend the use of a DOAC for anticoagulation therapy in atrial fibrillation in patients who:
A. Have a CHA2DS2VASc of 2 for men and 3 for women
B. Have a mechanical heart valve
C. Have severe mitral stenosis
D. Are on concomitant phenytoin

Q1 Answer: B Q2 Answer: A

Assessment of Pharmacist and Student Pharmacist Knowledge and Comfort Level with Tobacco Cessation Considerations in LatinX Patients

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Purpose: Public health research analyzing health equity amongst tobacco cessation services has consistently reported LatinX people who smoke run into greater barriers when trying to find and use treatments for cessation. Eskenazi Health, a large county hospital in central Indiana, provides care to one of the largest populations of LatinX patients in Indiana. In 2023, Eskenazi Health will implement a new pharmacist-driven prescribing protocol for tobacco cessation products. The authors of this study will provide a toolkit that will assist pharmacists and pharmacy students with providing culturally tailored cessation services targeting LatinX and Spanish-speaking patients. The purpose of this study is to assess pharmacist and pharmacy student comfort level and knowledge with providing tobacco cessation to the LatinX community both pre- and post-education and toolkit review.

Methods: An educational seminar and toolkit was provided to pharmacists and student pharmacists. Data was analyzed through a pre- and post-survey and cross-sectional study. The study intervention is the creation of a toolkit containing tobacco cessation resources geared to aid the LatinX community. Contents of the toolkit includes information about tobacco cessation resources available in Spanish, an overview of Spanish vocabulary related to tobacco cessation, tips on how to access and effectively work with an interpreter, information on forms of tobacco targeted towards the LatinX community, an analysis of LatinX smoking trends, and a review of culturally contextualized interventions that previous studies have identified to be effective within this patient demographic. The toolkit was distributed via an in-service educational seminar and webinars series. The primary endpoint is an assessment of pharmacist and pharmacy student comfort level and knowledge with providing tobacco cessation to the LatinX community both pre- and post-education and toolkit review.

Results: Final results and conclusions are pending and will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:
Identify helpful resources for tobacco cessation in the LatinX Spanish-speaking patient population
Recall basic Spanish vocabulary knowledge related to tobacco cessation
Self Assessment Questions:
Translate the following phrase: chicle de nicotina
A. Nicotine inhaler
B. Nicotine gum
C. Nicotine patch
D. Nicotine lozenge
What is the Spanish Quitline number?
A. 1-877-44U-QUIT
B. 1-877-NO SMOKE
C. 1-800-QUIT NOW
D. 1-800-QUIT SMOKE
Q1 Answer: B Q2 Answer: A

Impact of pharmacist involvement in ensuring medication affordability to improve access at discharge

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Purpose: Medication nonadherence is a multifactorial issue that has been shown to be a large contributor to hospital readmissions. One modifiable cause is medication cost, also called cost related nonadherence (CRN). To prevent CRN, it is imperative that providers assess medication affordability and access prior to discharge. The positive impact of pharmacist involvement at discharge has been shown in previous studies; however, literature regarding pharmacist impact on medication access and cost assistance is limited. In an effort to improve medication access, University of Louisville (UofL) Hospital Pharmacy Department created an initiative to evaluate medication affordability for select, high-cost medications prior to patientsâ€™ discharge. The purpose of this study is to evaluate the impact of this pharmacist-driven initiative aimed to address high-cost medication access prior to discharge from an acute inpatient setting.

Methods: This study was a retrospective chart review of patients newly initiated on designated high-cost medications, including direct oral anticoagulants (DOACs) (i.e. apixaban, rivaroxaban, dabigatran and edoxaban), treatment dose low molecular weight heparin (LMWH), ticagrelor and lacosamide three months prior to and three months following initiative implementation. Patients were excluded if they were discharged to a long-term care facility, pregnant or incarcerated. Patient specific data was collected and assessed through the electronic health record. The primary outcome evaluated the post-implementation group alone and included number of patients reviewed and number of pharmacist interventions. Pharmacist intervention was defined as pharmacist evaluation of medication affordability or access of previously listed high-cost medications followed by appropriate documentation. Secondary outcomes included both pre- and post-implementation groups and evaluated number of patients educated, 30-day readmissions, prescriptions picked up from the UofL Outpatient pharmacy and revenue generated per prescription.

Results/Conclusions: Results and conclusions will be presented at Great Lakes Pharmacy Resident Conference.
Learning Objectives:
Define cost-related medication nonadherence and its impact on overall adherence

Discuss literature regarding pharmacist impact on discharge medication services

Self Assessment Questions:

Which of the following represent a cause of medication nonadherence?

A. Provider-patient communication
B. Lack of medication accessibility
C. Pharmacist involvement
D. Medication education

Which of the following are potential pharmacist interventions that could be made in the inpatient setting to positively impact medication adherence?

A. Discharge counseling
B. Copay and patient assistance program enrollment
C. Verification of medication access
D. All of the above

Q1 Answer: B Q2 Answer: D

Comparison of the Use of SGLT2i and GLP1RA in Patients with Diabetes Managed by PCP Alone vs Patients Co-managed by a Pharmacist

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Purpose: The 2022 American Diabetes Association (ADA) guidelines for the treatment of diabetes established SGLT2i and GLP1RA as options for first-line therapy in type 2 diabetes mellitus (T2DM), depending on comorbidities and patient-specific factors. The objective of this study is to determine if patients co-managed by a pharmacist operating under a collaborative practice agreement are more likely to use an SGLT2i or GLP1RA as compared to patients managed solely by a primary care provider (PCP).

Methods: This study will be conducted as a retrospective chart review. The electronic medical record system will identify patients who had a visit with a primary care provider (PCP) or a pharmacist for management of type 2 diabetes mellitus (T2DM) during July 2021 to December 2021. Exclusion criteria included co-management by endocrinology, diagnosed type 1 or gestational diabetes, and dialysis. After screening for exclusion criteria, patients identified will then be separated randomly into equal groups for comparison. The following data will be collected: patient age, gender, weight, body mass index (BMI), estimated glomerular filtration rate (eGFR), insurance type, medications used for diabetes, pertinent comorbidities, use of a patient assistance program to receive medications, number of visits for diabetes management within the 6-month period, statin use, glycated hemoglobin, and hospital readmission for diabetes or cardiovascular-related concerns from July 2021 to June 2022. All data will be recorded without patient identifiers and maintained confidentially. The primary endpoint is percent use of SGLT2i and GLP1RA in the pharmacist co-managed population vs the PCP alone population. Secondary endpoints include percent of patients requiring assistance for cost concerns, number of visits for diabetes management, use of SGLT2i or GLP1RA for pertinent comorbidities, and hospitalizations for diabetes or cardiovascular-related concerns.

Results/Conclusion: Final results and conclusion will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe the standard of care for the management of type 2 diabetes.
Identify SGLT2i and GLP1RA agents that have shown benefit in pertinent comorbidities, such as cardiovascular disease, renal disease, and obesity.

Self Assessment Questions:

Which of the following comorbidities would most benefit from the addition of an SGLT2i to diabetes therapy?

A. Obesity
B. Heart failure with reduced ejection fraction
C. Chronic obstructive pulmonary disease
D. Hypertension

Which of the following GLP1RA have shown beneficial effect on major adverse cardiovascular events (MACE) in clinical trials?

A. Dulaglutide
B. Liraglutide
C. Semaglutide
D. All of the above

Q1 Answer: B Q2 Answer: D

Evaluation of Ketorolac Dosing on the Incidence of Acute Kidney Injury at a Large Academic Medical Center

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gastrointestinal and renal adverse events. Data from one study showed no increased risk of acute kidney injury (AKI) when ketorolac was used for â‰¤ 5 days. This data has influenced the dose and duration of ketorolac use since publication.

Methods: A single-center retrospective review was conducted at a large academic medical center between May 1st, 2016 and May 1st, 2022 in admitted patients receiving ketorolac. Patients were divided into three cohorts. The high-dose cohort received higher than FDA-approved dosing based on age and weight. Standard-dose cohort received FDA-approved dosing and the third cohort did not receive ketorolac. Patients were excluded if a baseline serum creatinine (SCr) was not obtained within 24 hours of first ketorolac administration, a SCr was not obtained within 5 days following ketorolac exposure, or if they received other NSAIDs. Patients in each group were matched based on age, gender, comorbidities, and concomitant nephrotoxic medications.
Outcomes: The primary endpoint is the incidence of AKI 24 hours after ketorolac initiation and up to 7 days following discontinuation. Secondary endpoints include incidence of major bleeding, cardiovascular thrombotic events, hyperkalemia, and all-cause mortality.
Preliminary Results: AKI occurred in 11 (21.2%) patients in the high-dose group, 6 (11.5%) patients in the standard-dose group, and 10 (19.2%) patients in the control group. Hyperkalemia occurred in 9 (17.3%) high-dose patients versus 1 (1.9%) and 4 (7.7%) patients in the standard-dose and control group, respectively. Five (9.6%) patients in the high-dose group experienced a major bleed compared to 4 (7.7%) and 6 (11.5%) standard-dose and control group, respectively. Final results and statistical analyses are in progress and will be reported at a later date.
Learning Objectives:
Review the existing literature surrounding the FDA-approved dosing and duration of ketorolac usage.
Identify the ideal ketorolac dosing regimen for adequate pain management while also reducing the incidence of adverse effects
Self Assessment Questions:
What maximum duration of therapy is currently issued by the FDA-approved dosing guidance?
A. 3 days
B. 5 days
C. 7 days
D. 10 days
Which of the following is a boxed warning of ketorolac?
A. Increased risk of suicidal thoughts
B. Increased risk of cardiovascular thrombotic events
C. Increased risk of liver injury
D. Increased risk of tendon rupture
Q1 Answer: B Q2 Answer: B

Determining the Negative Predictive Value and Positive Predictive Value of MRSA/Staph Aureus DNA-Screen in Malignant Hematology and Bone Marrow Transplant Patients with Febrile Neutropenia: A Single Health System, Retrospective, Observational Study

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immunocompromised state. Only 20-30% of patients will have an identifiable organism throughout the disease course. Current guidelines recommend initiating anti-microbials that cover gram negative organisms, including Pseudomonas aeruginosa, and recommend initiating anti-MRSA agents in specific clinical scenarios, including central nervous system involvement, pneumonia, skin and soft tissue infection, vascular access device, or hemodynamic instability. While efforts are being made to expose less patients to anti-MRSA antimicrobials, studies still need to be done to validate current interventions. The purpose of this study is to validate the use of MRSA/staph aureus DNA screen in malignant hematology and bone marrow transplant patients with febrile neutropenia, to mitigate exposure to anti-MRSA antibiotics and promote quality antimicrobial stewardship efforts.

This single-health system, retrospective, observational study will be conducted at UC Health, including patients at the University of Cincinnati Medical Center and West Chester hospitals. Participants to be included must be at least 18 years of age with a hematologic malignancy or bone marrow transplant recipient, diagnosed with febrile neutropenia, must have cultures collected, received a MRSA/staph aureus DNA screen, and have received at least one dose of an anti-MRSA antimicrobial. Exclusion criteria include pregnancy. Eligible patient records to be included will be those available through UC Health from August 2015 â€“ July 2022.

The primary outcome will be the negative predictive value and the positive predictive value of the MRSA/staph aureus DNA screen. Secondary outcomes include but are not limited to 30-day mortality at the time of febrile neutropenia diagnosis and total anti-MRSA therapy days.

Data collection and analysis are on-going. Results will be presented at Great Lakes Pharmacy Residents Conference in April 2023. A conclusion will be forth coming based on results.
Learning Objectives:
Recognize appropriate indications for initiating anti-MRSA therapy in malignant hematology patients with febrile neutropenia.

Describe the clinical impact the results will have on antimicrobial stewardship

Self Assessment Questions:

Which of the following is an appropriate indication for initiating anti-MRSA in patients with febrile neutropenia?

A. Hemodynamic instability
B. Initial episode of fever
C. Nausea and vomiting
D. Urinary tract infection

Which of the following is a primary objective of this research project?

A. 30-day mortality at the time of febrile neutropenia
B. Rate of acute kidney injury while on vancomycin
C. Negative predictive value of the MRSA nasal swab
D. Total duration of anti-MRSA therapy

Q1 Answer: A Q2 Answer: C

Evaluation of Antimicrobial Prophylaxis in Genital Gender Affirmation Surgery

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prophylaxis regimens in the perioperative setting, which can be applied to genital gender affirmation surgeries, exist in two major guideline documents. The Infectious Diseases Society of America offer recommendations on prophylactic antimicrobial regimens for a wide variety of surgical procedures while the American Urological Association provides recommendations specific to urologic surgeries. Despite these resources, neither include formal guidance on genital gender affirmation surgeries, largely due to the lack of primary literature in this area. Therefore, selection of an appropriate antimicrobial prophylactic regimen is based on extrapolation of data and expert opinion.

Statement of Purpose: The purpose of this study is to evaluate the impact of the health-system recommended antimicrobial regimens on post-operative infection rates and complications to determine if revisions are needed. This will also address the gap in literature regarding antimicrobial prophylaxis in gender affirmation surgeries.

Methods: This retrospective observational study will evaluate the efficacy of antimicrobial prophylaxis regimens for genital gender affirmation surgeries. All data will be gathered from procedures performed by a single surgeon at Indiana University Health and Eskenazi Health in Indianapolis, Indiana. Patients were included if they were at least 18 years of age and completed genital gender affirmation surgery at either of these two institutions between June 1, 2020 and June 30, 2023. Exclusion criteria included incarceration and pregnancy. The primary outcome of this study was to evaluate the prevalence of surgical site infections within six months after surgery. Secondary outcomes included prevalence of other post-operative infections, and the correlation of demographic data, type of surgery, antibiotics, dose, and number of subsequent doses to the development of post-operative infections.

Results/Conclusion: Results and conclusions will be presented at the 2023 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe genital gender affirming surgeries and understand common post-operative complications.
Identify common antimicrobial regimens and proper dosing strategies for surgical antimicrobial prophylaxis.

Self Assessment Questions:

1. Which of the following medications is the most common antibiotic given peri-operatively to prevent surgical site infections?

A. Vancomycin
B. Gentamicin
C. Cefazolin
D. Ampicillin

At what time should antimicrobial prophylaxis with ceftriaxone + metronidazole be administered in surgical patients?

A. 30 minutes before incision
B. 60 minutes before incision
C. 90 minutes before incision
D. 120 minutes before incision

Q1 Answer: C Q2 Answer: B

Optimizing Medication Restrictions in the Electronic Health Record

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Purpose: A formulary system is a core component of health systems to ensure the safe and effective use of medications. According to American Society of Health-System Pharmacists (ASHP) guidelines, a formulary system with strategies to guide appropriate medication use can improve therapeutic outcomes, prevent adverse events, and reduce costs. A common guided-use strategy includes the use of formulary restrictions. Tools within electronic health record (EHR) platforms, including clinical decision support (CDS), have evolved to incorporate guided-use strategies to support formulary compliance. Currently, there is a lack of literature evaluating specific CDS tools employed to facilitate formulary adherence. Froedtert & the Medical College of Wisconsin (F&MCW) employs several formulary restriction types, including outpatient use only, prescriber specialty, dosing limitations, and more. CDS tools used to employ restrictions include omitting medications from preference lists, adding alerts to utilize formulary alternatives, placing medications into order sets, and adding order instructions that outline current restrictions in place. The purpose of this research project is to assess what CDS functionalities are employed to support restricted medications on F&MCWâ€™s formulary and identify opportunities for incorporating newer functionalities.
Methods: This is an observational study analyzing the relationship between restricted medications and the associated CDS tools employed as part of the formulary restriction. Medications with restrictions implemented between September 1, 2014 and June 17, 2022 are included. Key exclusion criteria include medications with temporary medication shortage restrictions, investigational medications, medications administered in outpatient ambulatory clinics, and intraprocedural medications. The primary outcome is percent of restricted medications utilizing at least one type of CDS functionality. Secondary outcomes include percent of restricted medications with more than one CDS functionality applied and frequency of CDS functionality employed for each type of formulary restriction.
Results/Conclusion: Data analysis is ongoing. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.
Learning Objectives:
Discuss how employing clinical decision support tools to support medication restrictions can facilitate adherence to a hospital formulary
Explain the role of utilizing clinical decision support in an electronic health record
Self Assessment Questions:
A health-system formulary that incorporates guided-use strategies can
A. Improve therapeutic outcomes
B. Decrease rates of adverse events
C. Reduce costs
D. All of the above
Which of the following is NOT a benefit of implementing clinical decision support?
A. Increased quality of care
B. Improved workflow efficiency
C. Decreased hospital length of stay
D. Increased provider satisfaction
Q1 Answer: D Q2 Answer: C

Dalbavancin Compared to Standard of Care in Patients that Require Long-Term Intravenous Antimicrobial Therapy that Cannot Receive Outpatient Intravenous Antimicrobial Therapy

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Purpose:
Patients with Staphylococcus aureus (S. aureus) bacteremia typically require intravenous (IV) antibiotics for a minimum of two weeks and additional time for endocarditis or osteomyelitis. Patients are started on IV therapy inpatient then transfer to a facility or discharge home with a long-term line for the duration of therapy. Patients unsuitable for an IV line outpatient remain in the hospital or facility until antibiotics are complete leading to increased healthcare costs. Dalbavancin is a lipoglycopeptide antibiotic indicated for acute bacterial skin and structure infections caused by designated gram-positive organisms including S. aureus with a half-life of up to 258 hours or 11 days, which allows for once weekly dosing. However, there is a need for more evidence in use for infections requiring longer term therapy. The purpose of this study is to identify the failure rate of dalbavancin compared to standard of care (SOC) for these infections.

Methods:
This study was a retrospective, case-match control comparing patients that received dalbavancin versus SOC for S. aureus bacteremia requiring at least four weeks of IV antibiotic therapy who could not discharge with an IV line. Standard of care antibiotics were vancomycin, cefazolin, nafcillin, or daptomycin. Patients were included if â‰¥ 18 years old, positive S. aureus blood cultures, infection requiring at least four weeks of IV antibiotics, and received at least one dose of dalbavancin or two weeks of SOC antibiotics. The primary outcome was treatment failure defined as clinical or microbiological relapse of the same organism or hospital readmission for an infection related cause within 90 days of completing therapy. Secondary outcomes include cost difference between dalbavancin and SOC, length of hospital stay, and 90-day mortality.

Results & Conclusion: Data collection is on-going. Full results and conclusion will be presented at the Great Lake Pharmacy Residency Conference in April 2023.
Learning Objectives:

Review alternative treatment options for patients requiring long-term intravenous antibiotics
Discuss benefits and disadvantages of utilizing a long-acting antimicrobial in patients requiring long-term antibiotics.

Self Assessment Questions:

What is the guideline recommended minimum treatment duration for right-sided, native valve endocarditis caused by MRSA?

A. 2 weeks
B. 4 weeks
C. 6 weeks
D. 8 weeks

What is a side effect of dalbavancin therapy?

A. Acute kidney injury
B. Nausea
C. Electrolyte disturbances
D. Rhabdomyolysis

Q1 Answer: C Q2 Answer: B

Evaluation of stress ulcer prophylaxis agents on upper gastrointestinal bleed and mortality in mechanically ventilated adults: a retrospective study

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Purpose: Clinically important gastrointestinal bleeding (CIGB) from stress-related ulcers in the gastrointestinal (GI) tract occurs in up to 5 percent of critically ill patients, resulting in as high as a 49 percent mortality rate in this patient population. Stress ulcer prophylaxis (SUP) is utilized in an estimated 70 percent of critically ill patients to reduce the probability of GI bleeding events, and is primarily accomplished through the use of employing either a proton pump inhibitor (PPI) or histamine-2 receptor antagonist (H2RA). However, existing literature and guidelines differ regarding which class is favored as each class has been shown to decrease the risk of CIGB. This study was conducted to assess the safety and effectiveness of PPIs versus H2RAs for SUP in mechanically ventilated patients to determine if one class should be preferred over the other.
Methods: This is a retrospective, single-center, pharmacoepidemiologic study conducted in a medical ICU. Adult patients aged 18-89 years were included if they were admitted to the ICU between January 1, 2019 and September 1, 2022, received invasive mechanical ventilation for at least 24 hours, and received SUP with either a PPI or H2RA (or both) within 24 hours of intubation for a duration of at least 48 hours. The primary outcome was the rate of CIGB at least 48 hours after ICU admission. The primary outcome was defined using International Classification of Diseases, Tenth Revision (ICD-10) codes with cross referencing for a drop in hemoglobin, requirement of blood transfusions, and/or hemodynamic instability to further define CIGB. The secondary outcomes were in-hospital mortality and the incidence of nosocomial pneumonia, Clostridium difficile infection, thrombocytopenia, and delirium. Categorical data was evaluated with the Chi-squared test to compare cumulative incidences, and continuous data was analyzed with the Studentâ€™s t-test.
Results/Conclusions: To be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Review indications for initiating stress ulcer prophylaxis.
Discuss whether proton pump inhibitors or histamine-2 receptor antagonists should be preferred for stress ulcer prophylaxis.

Self Assessment Questions:

Which of the following is a known risk factor for GI bleeding that could require the use of stress ulcer prophylaxis?

A. Coagulopathy
B. Chronic NSAID use
C. Mechanical ventilation for >48 hours
D. All of the above

Which of the following is NOT a potential complication associated with PPIs?

A. Nosocomial pneumonia
B. Clostridium difficile infection
C. Leukocytosis
D. Delirium

Q1 Answer: D Q2 Answer: C

IMPACT OF COVID-19 INFECTION ON THE INCIDENCE OF CLOTRIDIOIDES DIFFICILE INFECTION

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this study was to assess the risk of CDI after infection with COVID-19.
Methodology: All patients over 18 years old admitted to a tertiary community hospital from 3/1/2020 to 7/31/2022 were included in the study. Patients were first stratified to COVID-19 positive and COVID-19 negative based on serologic testing. Repeat positive COVID-19 tests within 30 days of initial test were considered as one case. Patients were then stratified to either CDI positive or CDI negative. Repeat CDI positive tests within 6 months of the initial test were considered one case. Data collection was performed on CDI positive patients to gather recent COVID-19 infection status and baseline characteristics.
Results: There were 19,254 patient admissions to the hospital during the study period. There were 2,075 patients who were COVID-19 positive during that time frame. Of those 2,075 COVID-19 positive patients, 20 patients (0.96%) had initial instances of CDI in the following 90 days. Of the remaining 17,179 COVID-19 negative admissions, 252 patients (1.41%) had initial instances of CDI infection in the following 90 days. The COVID-19 positive and negative groups were similar in baseline characteristics. The odd ratio for CDI after COVID-19 infection was 0.654 (p=0.067). The percentage of patients with CDI after COVID-19 infection who received antibiotics was 90% (18/20 patients) compared to 67% (167/252 patients) in the group without COVID-19 infection in the prior 90 days (p=0.029).
Conclusion: This study did not establish a correlation between COVID-19 infection and CDI. Patients with COVID-19 infection before CDI were more likely to have received antibiotics in the preceding 90 days. Larger studies would be useful in determining the association between these disease states.
Learning Objectives:
Identify risk factors for Clostridioides difficile infection commonly present in COVID-19 infections
Describe current literature evaluating the correlation between Clostridioides difficile infection and COVID-19 infection
Self Assessment Questions:
Which of the following is NOT a risk factor for Clostridioides difficile infection that is common in patients with COVID-19?
A. Older age
B. Prior antibiotic use
C. Lung disease
D. Prior hospitalization
In which of the following specific situations, should antibiotic therapy be considered for patients with COVID-19 according to the NIH?
A. Loss of taste or smell
B. Increased oxygen requirements
C. Temperature (>100.8Â°F)
D. Shock
Q1 Answer: C Q2 Answer: D

Was it something I said?: Evaluating the impact of gender on acceptance of pharmacy resident interventions
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demonstrated that female pharmacists are less likely to have their recommendations accepted than male colleagues. This disparity has implications for the quality of care patients receive. It is unknown if similar bias exists when recommendations are made by male versus female pharmacy residents who are at the same stages of career and training.

Purpose: To determine the association of gender on acceptance of pharmacy resident interventions and to bring awareness to any gender biases that may exist within healthcare teams.

Methods: The current study is a prospective, multisite, cohort study conducted between November 2022 and April 2023. The primary outcome is the percentage of standardized recommendations made by postgraduate year one (PGY1) pharmacy residents that were accepted by prescribers. Secondary outcomes include percentage of recommendations accepted according to resident-specific and prescriber-specific variables. To detect a 20% between-group difference, a desired sample size of 132 interventions was estimated, assuming an alpha level set at 0.05 and power of 80%. The association of pharmacy resident gender with acceptance of recommendations will be assessed using logistic regression controlling for resident, prescriber, and patient characteristics. Multivariate analysis will also be conducted to identify independent variables contributing to the primary outcome.

Summary: Results and conclusions will be presented at Great Lakes Pharmacy Residency Conference.
Learning Objectives:
Identify factors independently associated with pharmacy resident recommendations accepted by health care teams.
Discuss the impact that gender bias in healthcare teams can have on pharmaceutical care.
Self Assessment Questions:
Which of the following has been shown to positively influence prescriber acceptance of recommendations made by pharmacists?
A. Whether the recommendation was solicited or not

B. Being present at the time of the recommendation
C. Prescribersâ€™ lack of understanding of pharmacokinetic parameters
D. The deemed importance of the recommendation
JK is a female pharmacist who has had four of her clinically appropriate recommendation rejected during rounds today. According to evidence, which of the following is most likely to result from this potential gender bias?
A. The pharmacist becomes disengaged and does not make further recommendations to the team.
B. The pharmacist mistakenly makes a recommendation that is clinically inappropriate.
C. The pharmacist ignores the teamâ€™s decision and moves forward with the recommendations anyways.
D. The pharmacist calls her male colleague to make the same recommendations, which are accepted.
Q1 Answer: B Q2 Answer: A

Comparison of Door-to-Needle Time with Alteplase versus Tenecteplase for Acute Ischemic Stroke: A Retrospective Analysis

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Background: Stroke has remained one of the leading causes of death in the United States. Ischemic strokes account for 87% of all strokes and occur when a blood vessel in the brain is blocked, leading to reduced blood flow. Treatment is focused on removal of the blockage in order to minimize further ischemia to brain tissue. The two mainstays of treatment for clot removal include fibrinolytic therapy and mechanical thrombectomy. Guidelines recommend the use of alteplase as preferred fibrinolytic therapy; however, in current practice, there has been an increased use of tenecteplase. Recent literature has demonstrated tenecteplase improves patient outcomes compared to alteplase when used for the treatment of ischemic stroke. The purpose of this study is to determine whether the use of tenecteplase shortens door-to-needle time and improves outcomes to a greater extent than alteplase.

Methods: This was a retrospective, single-center chart review. Patients aged > 18 with a diagnosis of ischemic stroke who received fibrinolytic therapy with alteplase or tenecteplase were eligible for inclusion. Patients were excluded if they had a diagnosis of hemorrhagic stroke, transferred from an outside hospital, or were part of a protected patient population. The primary endpoint was door-to-needle time. Secondary endpoints included change in National Institutes of Health Stroke Scale (NIHSS) 24-hours post fibrinolytic therapy, change in NIHSS 24-hours post mechanical thrombectomy in eligible patients, time to thrombectomy in eligible patients, hemorrhagic conversion, post thrombectomy reperfusion of the ischemic territory, hospital length of stay, and in-hospital mortality. Demographic data was characterized using descriptive statistics. The primary and secondary outcomes were analyzed using t-tests for continuous data and chi-squared tests for nominal data.

Ninety-four patients were included in the study with 44 and 50 patients in the alteplase and tenecteplase cohorts, respectively. Final conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:
Recall the clinical practice guideline recommendations for the acute management of ischemic stroke.
Identify the pharmacokinetic differences that exist between alteplase and tenecteplase.

Self Assessment Questions:
The American Heart Association and American Stroke Association recommend which of the following as the mainstays of treatment for clot removal in acute ischemic stroke?
A. Fibrinolytic therapy in eligible patients
B. Mechanical thrombectomy in eligible patients
C. Fibrinolytic therapy and mechanical thrombectomy in eligible patients
D. None of the above
Which of the following is unique to tenecteplase therapy when compared to alteplase therapy?
A. Exerts its mechanism by converting plasminogen to plasmin
B. Shorter duration of action
C. Less fibrin specific
D. More resistant to plasminogen activator 1 (PAI-1)
Q1 Answer: C Q2 Answer: D

Implementation of an Antibiotic Selection Guide for Outpatient Antibiotic Prescriptions in the Emergency Room

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Purpose: To assess the impact of an antibiotic selection guide on outcomes in patients discharged from the emergency room prescribed antibiotics for acute uncomplicated cystitis or skin and soft tissue infections (SSTI).
Methods: A pre-post retrospective chart review was conducted on 128 patients from July to December of 2022 to determine the effectiveness of an antibiotic selection guide (physical chart and P&T approved care set) on patient outcomes. A two-week wash out period was observed during the implementation process. The primary outcome was duration of therapy between the pre- and post-implementation groups and was assessed using an Independent-Samples Mann-Whitney U Test. The secondary outcomes were 30-day repeat visits, inappropriate duration, and medication selection. The secondary outcomes were assessed using a Chi-square test.
Preliminary Results: There were thirty-two patients reviewed in each group. The difference in pre- and post-implementation data for durations of treatment for SSTIâ€™s was 8.72 days versus 7.53 days (p = 0.003) and acute uncomplicated cystitis was 7.41 days versus 7.03 days (p =0.415). The 30-day repeat visit rate for SSTIâ€™s was 0% versus 6.25% and acute uncomplicated cystitis was 0% versus 0%. The difference in the instance of inappropriate duration of treatment selection for SSTIâ€™s was 84.4% versus 87.5% (p = 0.921) and acute uncomplicated cystitis was 46.9% versus 28.1% (p = 0.295). The difference in the instance of inappropriate medication therapy selection for SSTIâ€™s was 37.5% versus 9.4% (p = 0.035) and acute uncomplicated cystitis was 40.6% versus 59.4% (p = 0.39).
Conclusions: Implementation of an antibiotic selection guide decreased duration of treatment and instance of inappropriate medication therapy selection in patients requiring antibiotics for SSTIâ€™s but did not impact other outcome measures. Additional provider buy-in and time to implement the antibiotic selection guide would be needed to have a larger impact on prescribing habits.
Learning Objectives:
Review the data surrounding implementation of an antibiotic selection guide in the Emergency Department
Recognize an antibiotic selection guideâ€™s place in therapy and ways to enhance its effect on prescribing habits
Self Assessment Questions:
When an antibiotic selection guide was implemented in the Emergency Department setting, what group showed a statistically significant difference?
A. Durations of Treatment in the SSTI group
B. Instance of inappropriate duration of treatment selection in the acute uncomplicated cystitis group
C. Instance of inappropriate medication therapy selection in the SSTI group
D. A and C
When implementing clinical decision support (CDS), what are ways to increase engagement?
A. One-on-one interactions with providers explaining the CDS
B. Making the CDS accessible in multiple ways
C. Allowing proper time for implementation
D. All of the above
Q1 Answer: D Q2 Answer: D

Outcomes of High-Dose Oral Beta-Lactam Step-Down Therapy Compared to Alternative Oral Therapy for Bacteremic Urinary Tract Infections

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Purpose:
Complicated urinary tract infections (UTIs) and associated bacteremia are often treated with intravenous antibiotics followed by oral step-down therapy to a fluoroquinolone or trimethoprim/sulfamethoxazole (TMP/SMX). Oral beta-lactams were historically utilized less often due to concerns for subtherapeutic serum concentrations and treatment failure. Literature suggests oral beta-lactams as step-down treatment for uncomplicated bacteremia due to a urinary source are effective; however, there are no preferred oral beta-lactam agents and no routine dosing recommendations. The purpose of this study is to evaluate outcomes of high-dose cephalexin or amoxicillin step-down therapy for bacteremia due to a UTI caused by Escherichia coli, Proteus mirabilis, and Klebsiella pneumoniae or oxytoca compared to alternative therapy to evaluate effectiveness of local beta-lactam dosing recommendations.
Methods:
A retrospective, observational cohort study was conducted evaluating patients admitted from February 1, 2020 to October 1, 2022 at Trinity Health hospitals with gram-negative bacteremia from a urinary source. Adult patients were included if they received an empiric intravenous antibiotic active against the bacteria isolated and transitioned to appropriately dosed oral cephalexin, amoxicillin, TMP/SMX, or a fluoroquinolone. Excluded from the study were patients who received less than 72 hours of oral therapy, had a history of renal transplant, had a diagnosis of renal abscess or lobar nephronia, and those who expired during hospital admission. The primary outcome compared the composite of recurrent bacteremia or mortality within 30 days of completing oral therapy. Secondary outcomes compared include recurrent UTI, primary care physician follow-up, emergency department or urgent care revisit, and Clostridioides difficile infections within 30 days of treatment completion.
Results:
Results to be presented at the Great Lakes Pharmacy Resident Conference in April 2023.
Conclusion:
Conclusion to be presented at the Great Lakes Pharmacy Resident Conference in April 2023.

Learning Objectives:
Describe oral bioavailability of commonly prescribed beta-lactams, fluoroquinolones, and trimethoprim/sulfamethoxazole
List the boxed warnings associated with fluoroquinolone antibiotics
Self Assessment Questions:
Based on the consensus statement for optimizing treatment of uncomplicated gram-negative bacteremia, which of the following is an appropriately dosed (assuming normal renal function) highly bioavailable oral beta-lactam that can be recommended as step-down therapy?
A. Amoxicillin 500 mg three times daily
B. Cephalexin 1000 mg q6h
C. Cefdinir 300 mg twice daily
D. Amoxicillin 1000 mg q12h
The use of fluoroquinolones should be limited to treatment of complicated infections due to the risk of serious adverse events associated with their use. Which of the following adverse events is associated with a boxed warning for fluoroquinolones?
A. QTc shortening
B. Teratogenicity in pregnancy
C. Acute kidney injury
D. Exacerbation of myasthenia gravis
Q1 Answer: B Q2 Answer: D

Impact of Chemotherapy Educational Videos for Patients with Acute Myeloid Leukemia
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Background: Acute Myeloid Leukemia (AML) is one of the most common forms of leukemia in adult patients with 20,000 new cases estimated to occur in 2022 alone. A diagnosis of AML is a significant burden on patients and their families. Roughly 15% of patients were shown to meet criteria for acute stress disorder in a 2013 study following a diagnosis of an acute leukemia. Video education has been shown to provide foundational information and improve patient satisfaction in a variety of disease states, including venous thromboembolism, colorectal cancer, and breast cancer.

Purpose: This study aims to investigate the impact of an educational video on patient retention, anxiety, and satisfaction.

Methods: This is a single center, randomized, controlled trial of patients recruited from the adult medicine hematology service at the University of Michigan Hospital from October 2022 to February 2023. The study includes adult patients receiving induction therapy for AML at Michigan Medicine. Patients were randomly assigned to one of two groups, â€œVideo education + standard of careâ€ or â€œstandard of care onlyâ€The patients enrolled in the video group received education over their planned chemotherapy regimen via an 8-minute educational video on an iPad. The no video group received standard chemotherapy education from the inpatient hematology team. Patients were then given a questionnaire 24 to 96 hours after enrollment to answer follow-up questions regarding their chemotherapy regimen, assessing anxious feelings via the Hospital Anxiety and Depression Scale (HADS) , and self-assess their overall satisfaction with their chemotherapy education. Videos remain available to patients via an enduring QR code and YouTube links for use after completion of the knowledge assessment.

Results and conclusions will be presented at the Great Lakes Pharmacy Residents Conference.
Learning Objectives:
Identify the need for comprehensive and effective patient education
Report the impact of video education on patient knowledge retention, anxiety, and satisfaction
Self Assessment Questions:
Video education has previously been shown to be effective in which patient population
A. Sepsis
B. Venous Thromboembolism
C. Leukemia
D. Epilepsy
Which of the following AML therapies has been used since the 1970s
A. "7 + 3" - Daunorubicin and Cytarabine
B. Hypomethylating agents
C. FLT3 Inhibitors
D. Venetoclax
Q1 Answer: B Q2 Answer: A

Exploring Practice Engagement and Professional Fulfillment Among Community Pharmacy Staff in Michigan

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Purpose: The primary objective of this study is to explore effective strategies to increase engagement within community pharmacy practice in effort to mitigate burnout among pharmacy staff members. The prevalence of burnout in the community pharmacy setting in the United States has increased in recent years. According to a 2021 American Pharmacists Association survey, the most common contributors to stress and burnout in pharmacy were interruptions from phone calls, inadequate staffing, and inability to practice pharmacy in a patient-focused manner. Current strategies to tackle burnout focus on individual practices such as stress management and lifestyle changes. Although these strategies provide a â€œone size fits allâ€ approach to overcoming burnout, studies have not yet evaluated the opinions of community pharmacy staff members regarding pharmacy practice engagement and burnout mitigation. Methods: This is a cross sectional, mixed qualitative and quantitative survey study conducted among community pharmacy staff members in Michigan. The survey is designed to collect information regarding demographics, burnout strategies and professional fulfilment in practice by means of multiple choice, Likert scale, and yes/no questions. This study will include individuals aged 18 years and older employed in a community pharmacy setting for at least 6 months. The mitigation strategies suggested within the survey are informed through literature review as well as current community pharmacy workplace practice experience. Several demographics such as type of community practice setting, years of experience, amount of post-graduate training, etc., will be collected in effort to correlate individual characteristics to preferred methods of engagement and/or burnout mitigation. Survey data will be analyzed using descriptive statistics. The anticipated survey distribution period is between March 1 and July 1, 2023. Results/Conclusions: To be determined upon data collection and analysis.

Learning Objectives:

Define burnout and professional fulfillment in the community pharmacy setting.
Identify potential causes of burnout in community pharmacy practice

Self Assessment Questions:

Which of the following statements accurately defines professional fulfillment?
A. A syndrome that is said to result from chronic workplace stress that has not been successfully managed.
B. The degree of intrinsic positive reward a person receives from his or her work.
C. Feeling of energy depletion, exhaustion, negativism, or cynicism related to one's job, and reduced professional efficacy.
D. The ability to fulfill duties and responsibilities of oneâ€™s profession

Which of the following statements are correct?
A. The prevalence of burnout in the community pharmacy setting is less than 40%.
B. Pharmacists are the only personnel that experience burnout in community pharmacy.
C. Burnout in pharmacy does not play a role in the quality of patient care or patient safety.
D. Some common contributors to stress and burnout in pharmacy are interruptions from phone calls, inadequate staffing, and patient expectations and demands.

Q1 Answer: B Q2 Answer: D

Implementation of Penicillin Allergy Testing Pilot in a Health System: Phase II

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essential in improving patient outcomes and decreasing healthcare costs. Addressing the high percentage of listed penicillin allergies within our network was recognized as an area of improvement. This project was designed to collect and analyze data from Phase 2 of the penicillin allergy testing pilot performed at Community Hospital East, to determine success in implementation of a delabeling protocol. The data collected will be utilized to develop an effective program that can be implemented throughout Community Health Network.
In 2022, a pharmacist-led team applied the protocol developed during Phase I of the Penicillin Allergy Testing Pilot. Phase I identified inclusion and exclusion criteria to recognize patients who would be good candidates for skin testing or oral challenge. The inclusion and exclusion criteria established from Phase I was continued. Phase II addressed the lessons learned from Phase I. Goals of Phase II included developing a written script when speaking to patients to address the benefits of penicillin allergy testing, utilizing Emergency Department patients to undergo screening, and educating healthcare providers when necessary. Patients who metâ€¯inclusion criteria were interviewed. This project aimed to delabel 75% of the patients interviewed. Based on interview results, patients underwent intradermal/oral testing, automatic delabeling, or were not delabled. Data points collected were the number of patients delabeled, the number of patients screened for allergy testing, the number of patients interviewed, the number of patients who had a skin test or oral challenge, cost comparison of antibiotics used, the amount of time taken for each consult, the number of patients that consented to test, the number of patients authorized for testing by their inpatient provider and Patients who required emergency medications for an allergic response.

Learning Objectives:

Identify strategies to delabel penicillin allergies
Describe benefits of delabeling false penicillin allergies

Self Assessment Questions:

Which of the following patients would be appropriate for oral challenge?
A. History of nausea/vomiting 8 years ago

B. History of fever 15 years ago
C. History of angioedema 30 years ago
D. History of anaphylaxis defined by the NIAID/FAAN Criteria 20 years ago
When interpreting intradermal testing, what constitutes a â€œpositiveâ€ result?
A. Wheal is > 5 mm, and if flare is > wheal
B. Patient expresses discomfort from injections sites
C. Wheal is < 3 mm, and no flare reported
D. All examples are defined as negative results
Q1 Answer: A Q2 Answer: A

Impact of utilizing one-level versus two-level kinetics for determining area under the curve (AUC) of vancomycin

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PURPOSE: Vancomycin is a narrow therapeutic index medication that requires therapeutic drug monitoring for safety and efficacy. Recent guidelines emphasize a ratio of area under the curve over 24 hours to minimum inhibitory concentration (AUC/MIC) as the primary pharmacokinetic (PK) and pharmacodynamic (PD) target for vancomycin activity. An individualized goal of AUC/MIC 400-600 should be advocated for patients with suspected or definitive serious methicillin-resistant S. aureus (MRSA) infections. Recommended approaches to monitor AUC-guided dosing include the collection of two vancomycin concentrations collected near steady-state and utilizing first-order PK equations to estimate AUC or utilizing Bayesian software programs. In response to a vancomycin reagent shortage in April 2021, Trinity Health Oakland transitioned to one-level estimated AUC calculations for most patients. The primary aim of this study is to compare one-level versus two-level kinetic calculations used to monitor vancomycin therapy.

METHODS: This was a single center, retrospective cohort study of patients admitted to Trinity Health Oakland from July 1st, 2020, to December 31st, 2021, who received intravenous vancomycin and had at least one vancomycin level obtained. The following exclusion criteria were applied: age <18 years, indications of CNS infection or uncomplicated skin/soft tissue infection or urinary tract infection, renal replacement therapy, vancomycin levels obtained prior to steady state, vancomycin dosing by levels, and continuation of outpatient vancomycin regimen. The primary endpoint was percentage of vancomycin AUC calculations within goal range. Secondary endpoints include AUC levels within goal range on first and second check, number of vancomycin levels obtained, AUC levels requiring adjustment, number of attempts needed to achieve goal AUC, trough levels within goal range, 30-day infection recurrence, 30-day mortality, 30-day readmission rate, and hospital length of stay.

Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference

Learning Objectives:
Describe the pharmacokinetic/pharmacodynamic targets for vancomycin therapy
Identify the potential benefits and limitations of utilizing one-level kinetic calculations to monitor vancomycin therapy

Self Assessment Questions:
What is the primary pharmacokinetic/pharmacodynamic target for glycopeptides?
A. Peak/MIC
B. 24 h AUC/MICÂ
C. Time > MIC
D. Trough/MIC
Which of the following is true regarding utilizing one-level estimated AUC calculations to monitor vancomycin therapy?
A. Requires additional pharmacist time coordinating and evaluating vancomycin levels
B. Requires additional coordination between pharmacy, nursing, and phlebotomy
C. Requires utilizing estimated volume of distribution based on population averages
D. Has been proven to be equally effective as compared to two-level kinetics in calculating AUC
Q1 Answer: B Q2 Answer: C

Evaluation of neuromuscular blocking agent dosage in patients with obesity for rapid sequence intubation in the emergency department

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Purpose: To determine if dosing of neuromuscular blocking agents (NMBAs) for adult patients greater than 100 kg affects incidence of first pass success (FPS) during rapid sequence intubation (RSI) within the emergency department (ED).

Methods: This single center retrospective chart review was conducted at IU Health Methodist ED evaluating patients intubated using either succinylcholine (SUC) or rocuronium (ROC) NMBAs from 7/2017 to 7/2022. This study was composed of 2 cohorts: patients less than 100 kg and patients 100 kg or greater. Patients were included in this study if they were 18 years or older and received either SUC or ROC prior to RSI. Patients were excluded if FPS was not documented, RSI occurred outside of the IU Health Methodist ED, RSI was performed by a non-ED provider, or re-intubation for patients intubated prior to arrival. Pregnant or incarcerated patients were also excluded. The primary outcome assessed was incidence of FPS with RSI. Secondary outcomes included dose of NMBA administered, milligram per kilogram dose for both total body weight and corrected body weight. Adverse events evaluated include cardiac arrest secondary to respiratory arrest, provider documented difficult airway, more than 2 attempts for successful intubation, and requirement of surgical airway. Statistical analysis will be performed using Minitab software.

Results: Data collection and analysis are ongoing. Final results will be presented at the conference.

Learning Objectives:

Discuss the increased risks for patients with obesity undergoing rapid sequence intubation

Review the mechanism of action and weight-based dosing strategy of neuromuscular blocking agents in rapid sequence intubation

Self Assessment Questions:

Which of the following is a risk of RSI that is increased for patients with obesity?

A. Dental damage
B. Hypoxia
C. Hypotension
D. Arrhythmia

What is an appropriate weight-based dose of succinylcholine for RSI?

A. 0.6 mg/kg
B. 1.2 mg/kg
C. 1.5 mg/kg
D. 2.5 mg/kg

Q1 Answer: B Q2 Answer: C

Droperidol versus Ondansetron as First-Line Therapy for Nausea in the Emergency Department

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Purpose: Medication therapy is the cornerstone of treatment for acute nausea, yet efficacy can vary greatly depending on etiology and severity of illness. There are few high-quality studies comparing efficacy of different agents for acute undifferentiated nausea in the emergency department (ED). Ondansetron is considered the mainstay of therapy, despite rarely outperforming placebo for this indication.1 One agent which has historically shown improved efficacy over placebo for acute nausea and vomiting is droperidol; however, droperidol fell out of favor after the introduction of a Black Box Warning (BBW) for the risk of QT prolongation and/or torsade de pointes.1-3 Recently, several studies have tested the safety of droperidol and do not support the BBW at doses used for nausea.4 Several Emergency Medicine societies have published statements disagreeing with the BBW, which has since partially restored the place of droperidol in therapy.4-5 The objective of this study is to evaluate the efficacy and safety of parenteral droperidol versus ondansetron as first-line therapy for treatment of patients presenting to the ED with acute undifferentiated nausea.

Methods: This is a single-center, retrospective matched cohort study of adult patients presenting with nausea in one of nine Henry Ford Health EDs between November 3, 2021 and September 30, 2022. Patients are included if they received either parenteral droperidol or ondansetron as first- line treatment. Data collected from medical records include demographics, presenting symptoms, comorbidities, admission history, and medications administered. The primary efficacy outcome will evaluate administration of rescue therapy within a 12-hour observation window. Secondary endpoints include time to rescue therapy administration, ED length of stay, patient disposition, and safety events. Categorical data will be analyzed using Fisherâ€™s exact or Chi-squared tests, and continuous data will be analyzed using a Mann-Whitney U test.

Data is currently being collected, and results will be presented at the conference.

Learning Objectives:

Review the treatment of nausea in the emergency department and the role droperidol plays in therapy.

Describe adverse events associated with the use of droperidol for nausea.

Self Assessment Questions:

What class of antiemetic is droperidol?

A. Serotonin antagonist
B. Dopamine antagonist
C. Neurokinin antagonist

D. Antihistamine

Which of the following is an adverse effect of droperidol?

A. Headaches

B. Diffuse Myalgia

C. Extrapyramidal symptoms

D. Urinary frequency

Q1 Answer: B Q2 Answer: C

Continuation of critical care infusion orders after intensive care unit discharge on weekdays versus weekends and rate of pharmacist intervention

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Clinical pharmacist services in institutional settings have been shown to reduce medication errors, increase overall patient safety, and improve medication use. Transitions of care provides increased risk for medication errors, including transitions from the ICU. An identified risk in this population is continuing medications only appropriate for the ICU. This study examines the rate of occurrence of these medication errors when a clinical pharmacist is available in the ICU at the time of discharge compared to when one is not.

Methods:

This single center retrospective chart review was conducted at Memorial Hospital of South Bend. This study includes patients at least 18 years of age admitted to the ICU and transferred to a non-ICU location within the institution, having active orders for critical care infusions while admitted in the ICU. ICU exclusive infusions include all paralytics, sedatives, opioid analgesics, vasopressin, and titrated vasopressor infusions. The primary investigator conducted a retrospective analysis to identify qualifying patients from March 31, 2021 through March 31, 2022. Approximately 150 patients who were discharged from the ICU on a weekday will be selected for analysis, and 50 patients discharged over the weekend will be selected for comparison. Baseline characteristics to be collected include age, sex, race, comorbidities, date and time of ICU admission and discharge, reason for hospital and ICU admission, location after ICU discharge, and continuous infusions the patients were receiving while in the ICU. The primary endpoint of the study is the incidence of continuation of a critical care infusion order post ICU discharge in patients transitioned from the ICU. Secondary endpoints of the study include length of stay in the ICU and hospital, and incidence of medication related adverse effects after ICU discharge.

Results/Conclusion: Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Review qualities of critical care exclusive infusions and their potential for medication errors in transitions of care

Discuss the impact of pharmacist intervention on the prevention of medication errors in ICU transitions of care

Self Assessment Questions:

1. Based on the qualities of critical care exclusive infusions, which of the following would not need to be discontinued on discharge from the ICU?

A. Fentanyl

B. Heparin

C. Propofol

D. Norepinephrine

2. During which step of medication use could a pharmacist intervene to prevent the continuation of an exclusive critical care infusion on discharge from the ICU?

A. Administration

B. Ordering

C. Monitoring

D. It would not be necessary for a pharmacist to intervene

Q1 Answer: B Q2 Answer: C

Impact of methicillin-resistant Staphylococcus aureus nasal PCR vs. culture on vancomycin use in pneumonia

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The methicillin-resistant Staphylococcus aureus (MRSA) nasal polymerase chain reaction (PCR) screen is a rapid, non-invasive, test which assesses MRSA nasal presence. It has a negative predictive value of 95.2-99.2% with a turnaround time of 12-24 hours. Previous data reported MRSA nasal PCR utilization led to a significant decrease in vancomycin use and levels ordered. Henry Ford Health (HFH) transitioned to a pharmacy-driven protocol MRSA nasal PCR in 07/2022 from MRSA nasal culture, which has a turnaround time of 48 hours. This study evaluates the impact of MRSA nasal PCR compared to nasal culture on vancomycin utilization in patients with hospital-acquired pneumonia and community-acquired pneumonia.

Methods:
This is a retrospective quasi-experimental study conducted at HFH. The pre-intervention group includes patients with MRSA nasal culture from September to December 2021; the post-intervention group includes patients with MRSA nasal PCR from September to December 2022. Inclusion criteria includes patients â‰¥ 18 years, receiving IV vancomycin for suspected pneumonia with negative results for MRSA nasal PCR or culture, and receiving antibiotic therapy for at least 5 days during admission. Exclusion criteria includes vulnerable population, patients with ventilator-associated pneumonia, and COVID-19 infection. The primary endpoint is to compare the proportion of vancomycin levels ordered before and after implementation of MRSA nasal PCR. Secondary endpoints include time to de-escalation of vancomycin, incidence of acute kidney injury, prevalence of pneumonia re-infection, and 30-day readmission rate. A total sample size of 200 was calculated based on the delta value of 15% to detect a difference in the primary outcome. The dichotomous, categorical, and continuous points will be analyzed using chi-square, t-test, and Mann-Whitney U respectively.

Summary of results and conclusion:
Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:
Identify the difference between MRSA nasal PCR and MRSA nasal culture.
Discuss the clinical utility of MRSA nasal PCR in directing treatment decisions.
Self Assessment Questions:
Which of the following is the true statement regarding MRSA nasal PCR and MRSA nasal culture?
A. MRSA nasal culture and MRSA nasal PCR are the same diagnostic tools used interchangeably
B. MRSA nasal culture has positive predictive value of 95.2-99.2%
C. MRSA nasal PCR has negative predictive value of 95.2-99.2%
D. MRSA nasal PCR has the turnaround time of 24-48 hours
Which of the following is true regarding the clinical impact of MRSA nasal PCR?
A. MRSA nasal PCR can be used to de-escalate vancomycin for all the infections
B. MRSA nasal PCR can be used to de-escalate vancomycin for the indication of pneumonia
C. The results are often not available before microbiological cultures finalized
D. None of the above
Q1 Answer: C Q2 Answer: B

Assessment of Antimetabolite Intolerance in Older Lung Transplant Recipients
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Background: Antimetabolites are associated with adverse effects that often lead to therapy adjustments or discontinuations; older lung transplant recipients (LTRs) may have an increased susceptibility to these effects. We sought to compare the intolerance of antimetabolites and its impact on transplant outcomes between older and younger LTRs.
Methods: A single-center, retrospective analysis of adult LTRs transplanted between 1/1/2019- 10/31/2021 initiated on an antimetabolite (mycophenolate or azathioprine), tacrolimus, and steroids post-transplant was conducted. Patients were excluded for: previous transplant, multi-organ transplant, positive crossmatch, admission > 90 days, or death during index transplant admission. Patients were stratified by age at the time of transplant (â‰¥ 60 or < 60 years) and assessed for the first-year post-transplant. The primary outcome was incidence of antimetabolite intolerance (dose adjustment, agent/formulation change, holding of antimetabolite, or antimetabolite discontinuation). Secondary outcomes were reason for intolerance, safety (infection, leukopenia), and efficacy (rejection, patient/graft survival).
Results: 109 LTRs were included; 54 in the older (â‰¥ 60 years) and 55 in the younger (< 60 years) cohort. Most LTRs were initiated on azathioprine, in accordance with institutional protocol (74%). Antimetabolite intolerance occurred in 61% of older and 53% of younger patients. The most common reason for intolerance was leukopenia. Biopsy proven acute rejection occurred more often in older LTRs (39% vs 18%, p=0.017). This no longer remained significant when controlling for induction, indication, transplant type, and gender (OR 2.79, 95% CI 0.87 â€“ 8.91). There was no difference in the incidence of leukopenia (44% older vs 51% younger, p=0.499) or infection (67% older vs 82% younger, p=0.070). Graft and patient survival were comparable.
Conclusion: Intolerance of antimetabolites between older and younger LTRs was similar. While most of LTRs required a modification to their initial antimetabolite regimen due to infection or adverse events, this did not impact transplant outcomes at 1 year.
Learning Objectives:
Identify if a difference in antimetabolite intolerance exists between older and younger lung transplant recipients
Discuss the effect of antimetabolite intolerance on efficacy and safety outcomes
Self Assessment Questions:
Which of the following adverse effects is commonly associated with antimetabolite intolerance?
A. Tremors
B. Leukopenia and thrombocytopenia
C. Hyperlipidemia
D. Edema
Which of the following effects is most concerning in a patient requiring modification of their antimetabolite due to intolerance?
A. Increased risk of infection
B. Decreased GI symptoms
C. Increased risk of rejection
D. Increased risk of hypertension
Q1 Answer: B Q2 Answer: C

Use of Remote Patient Monitoring Kits to Reduce Hospitalization and Mortality Rates for Patients with Heart Failure

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Purpose: Patients with heart failure (HF) are at an increased risk of volume overload, which can lead to hospital admission. The use of telemonitoring devices in HF patients to track vitals and body weight have gained popularity in recent decades. At Baptist Health Louisville (BHLOU), HF patients identified as high risk for readmission were given remote patient monitoring (RPM) kits, which included a tablet computer, device to measure vitals, weighing scale, blood pressure cuff, and transmitter. The purpose of this study is to determine if implementation of RPM kits leads to a reduction in HF hospitalizations and mortality.

Methods: This single-center, retrospective chart review evaluated adult patients presenting to the BHLOU heart failure clinic after a recent hospitalization for HF or need for IV diuretics within the past 60 days. The study evaluated patients pre- and post- implementation of RPM kits with a pre-implementation period of December 6, 2020, to August 31, 2021, and a post-implementation period of December 6, 2021, to August 31, 2022. The two primary outcomes assessed were differences in 30-day HF hospitalization rates and 30-day mortality rates before and after implementation of RPM kit from the follow-up heart failure clinic visit. Secondary outcomes included differences in number of interventions at 90 days, which is defined as initiation, discontinuation or dose adjustments of HF therapy; difference in 90-day HF hospitalization rates; and difference in 90-day mortality. A priori alpha value of less than 0.05 was used to show statistical significance. SPSS statistical software was used to perform statistical analysis.

Results/Conclusions: Will be presented at the 2023 Great Lakes Pharmacy Resident Conference
Learning Objectives:
Describe a potential role of RPM kits in patients with HF
Identify gaps in current literature on studies that evaluated RPM in HF patients
Self Assessment Questions:
Which is a potential role of RPM kits in patients with HF?
A. Reduction in utilization of healthcare resources

B. Slow progression of HF
C. Provide early indications of HF decompensation
D. Require fewer follow-up visits
Which is a gap in current literature on studies that evaluated RPM in HF patients?
A. Utilization of echocardiogram parameters to identify high risk patients
B. Differences in quality of life scores using validated questionnaires
C. Evaluating patients after a recent HF decompensation
D. Differences in HF readmissions
Q1 Answer: C Q2 Answer: A

Evaluation of Antimicrobial Use in Patients with ESBL-producing Enterobacterales Cystitis

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Purpose: Rates of infection with extended spectrum beta-lactamase (ESBL)-producing organisms have been steadily increasing. Community-associated cystitis has been identified as a potential cause. Because of this, the US Centers for Disease Control and Prevention (CDC) has labeled ESBL-producing Enterobacterales a serious threat requiring prompt and sustained attention. In response, Infectious Diseases Society of America (IDSA) released a new guidance document in March of 2022 for the treatment of ESBL-producing Enterobacterales infections. The objective of this study is to assess antimicrobial use in patients with ESBL-producing Enterobacterales cystitis, specifically reviewing appropriateness of agent selection based on the 2022 IDSA ESBL guidance document.

Methods: This study is a single-system, retrospective chart review assessing antimicrobial use in adult patients with ESBL-producing cystitis at UW Health Northern Illinois. Electronic health records were used to identify patients with positive urine cultures between July 1, 2021, to June 30, 2022. The data collected included age, gender, allergy status, weight, height, white blood cell count, serum creatinine, vital signs, microbiology results, antimicrobial treatment during hospital stay and at discharge, length of hospital stay, previous microbiology results, and previous antimicrobial use. The primary endpoint is the appropriateness of agent selection based on the 2022 IDSA ESBL guidance document. Secondary endpoints are antimicrobial therapy in patients with a history of ESBL infection in the prior 12 months, antimicrobial step-down therapy, duration of antimicrobial therapy, and incidence of recurrent ESBL cystitis, defined as ï,^{3} 2 episodes in the past 6 months or ï,^{3} 3 episodes in the past 12 months. Results of this study will be utilized to identify areas for improvement in antimicrobial prescribing, with the future intent of creating and implementing a protocol to help provide evidence-based recommendations for treatment of ESBL cystitis.

Results/Conclusions: Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.
Learning Objectives:
Discuss the epidemiology of ESBL-producing Enterobacterales cystitis
Recognize recommended antibiotics for ESBL-producing Enterobacterales cystitis depending on severity of infection
Self Assessment Questions:
What is the proposed mechanism behind the increased incidence of ESBL-producing Enterobacterales infections?
A. Hospital-acquired infections
B. Long-term care facility-acquired infections
C. Inherited resistance
D. Community-acquired infections
Which of the following would be an acceptable treatment for uncomplicated ESBL-producing Enterobacterales cystitis?
A. Ceftriaxone
B. Nitrofurantoin
C. Aztreonam
D. Ampicillin
Q1 Answer: D Q2 Answer: B

Clinical Outcomes of Incretin Mimetic Drugs Used for Weight Loss in a Pharmacist Run Clinic

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Purpose: Incretin mimetics drugs have significantly changed weight loss management. Pharmacist can play an important role in titrating and monitoring the medications used for weight loss. Patientâ€™s will not only be seen by their primary care providers but will have disease state specific care in the pharmacist run weight loss management clinic. The purpose of this study is to report the clinical outcomes of obese patients treated with liraglutide, semaglutide, and tirzepatide in a pharmacist run clinic.

Methods: A collaborative care agreement was signed with pharmacists and primary care providers that allowed pharmacists to clinically manage referred patient with glucose-like pepetide-1 (GLP-1) agonists or GLP-1/glucose-dependent insulinotropic polypeptide (GIP) dual agonists. The patient was required to have met the following criteria prior to being started on any medication: attempted and failed lifestyle changes, have a BMI greater than or equal to 30 or 27 with co-morbidities such as HTN, HLD, DM. Patients were excluded if they had a history of pancreatitis, medullary thyroid cancer, Multiple Endocrine Neoplasia type 2, severe renal impairment, gastroparesis, type 1 diabetes or pregnant/breastfeeding. Patients were seen by a pharmacist every 4 weeks in the weight loss management clinic and doses were titrated according to the FDA labeling of the medication. A review of the patientâ€™s chart will be conducted to collect the patientâ€™s BMI, weight, and waist circumference, at the initial visit and last visit. Not all patients were started at the same time and some patients discontinued therapy. In order to properly evaluate the patient's progress, the number of total visits from March 2022 until December 2022 will be considered when evaluating the patientâ€™s change in BMI, weight, and waist circumference.

Results: Data collection is currently ongoing. Results will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Describe how semaglutide, liraglutide, and tirzepatide can be used for weight loss

Review appropriate initiation criteria, dosing, and monitoring for semaglutide, liraglutide and tirzepatide

Self Assessment Questions:

LH is interested in starting semaglutide for weight loss. What is an appropriate dosing regimen for LH?

A. 0.25 mg weekly x4 weeks, 0.5 mg weekly x4 weeks, 1 mg weekly x4 weeks, 2mg weekly x4 weeks (max)

B. 0.6 mg daily increasing by 0.6 mg increments weekly until max dose of 3mg

C. 0.25 mg weekly x4 weeks, 0.5 mg weekly x4 weeks, 1 mg weekly x4 weeks, 1.7 mg weekly x4 weeks, 2.4 mg weekly x4 weeks (max)

D. 2.5 mg weekly x4 weeks increasing by 2.5 mg increments every 4 weeks until max dose of 15 mg

Which patient factor will prevent the patient from receiving semaglutide for weight loss?

A. Type 2 diabetes

B. Hyperthyroidism

C. History of hypertension

D. History of medullary thyroid cancer

Q1 Answer: C Q2 Answer: D

Use of Clonidine to Wean Dexmedetomidine in a Community Hospital

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Purpose: Dexmedetomidine is commonly used for sedation in critical care units. Prolonged dexmedetomidine infusions can lead to extended ICU and hospital stays, and abrupt discontinuation of dexmedetomidine infusions can lead to hyper-sympathetic withdrawal symptoms. Some data exists to suggest clonidine can be used to prevent dexmedetomidine withdrawal symptoms and speed up the weaning process with prolonged infusions. The purpose of this study will be to use our facilityâ€™s data to determine if clonidine has had a positive effect on the weaning of dexmedetomidine in our critical care units, and to use this analysis to guide future decision-making at our facility.

Methods: This study will utilize a retrospective chart analysis of patients seen in the critical care unit or progressive care unit of a community hospital in Corbin, Kentucky. Patients will be included who were sedated with dexmedetomidine for a minimum of 72 hours and aged 18 or older at the time of admission. Patients will be excluded who received clonidine during their stay prior to 72 hours after the initiation of dexmedetomidine. The treatment group will be patients who received clonidine after at least 72 hours on a dexmedetomidine infusion and will be compared with a control group of patients who did not receive any clonidine during their dexmedetomidine infusion. The primary outcome will be days of dexmedetomidine infusion following the clinical decision to begin weaning sedation as determined by clinical chart review. Secondary outcomes will include total days of dexmedetomidine infusion, total ICU days, total length of admission, and occurrence of dexmedetomidine withdrawal symptoms, including agitation, tachycardia, hypertension, and other hyper-sympathetic symptoms. Sub-analyses will be performed with categorization by clonidine dosing strategy and total amount of clonidine received.

Learning Objectives:

Describe the issues with weaning prolonged dexmedetomidine infusions in critical care units.

Discuss the potential benefits and risks of using clonidine to wean prolonged dexmedetomidine infusions.

Self Assessment Questions:

Which of these symptoms may result from weaning prolonged dexmedetomidine infusions too quickly?

A. Hypertension

B. Agitation

C. Tachycardia
D. All of the above
Which condition would be a concern limiting the use of clonidine in a patient?
A. Liver cirrhosis
B. Recent myocardial infarction
C. COPD
D. Hypertension
Q1 Answer: D Q2 Answer: B

Angiotensin II vs. Phenylephrine for the Management of Refractory Shock in Critically Ill Patients

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or greater, as recommended by the Surviving Sepsis guidelines, is a high priority of care. Some patients fail to reach this goal despite adequate fluid resuscitation, steroids, and high doses of two vasopressors. A newer drug recently approved by the FDA, angiotensin II, has seen use as a third-line vasopressor at our sister hospital McLaren Northern Michigan hospital. Comparative studies between angiotensin II and other vasopressors are currently lacking.

Statement of purpose: To assess the efficacy, outcomes, and adverse events of angiotensin II as a third-line vasopressor compared to phenylephrine in patients presenting with refractory shock.

Methods: This study is a retrospective chart review of patients who were admitted to the intensive care unit (ICU) at McLaren Oakland and McLaren Northern Michigan hospitals for septic shock and required either phenylephrine or angiotensin II as a third vasopressor. The primary endpoint analyzed in this study is the time period between initiation of the third vasopressor and achievement of the target MAP as recorded in the patientâ€™s chart.

Results: The angiotensin II group had an earlier average time between initiation of the drug and the time the goal MAP was reached compared to the phenylephrine group. Patients who received angiotensin II were also observed to have better mortality outcomes and less adverse effects. The phenylephrine group received much higher total doses of norepinephrine before starting their third vasopressor.

Conclusion: While the data seems to favor angiotensin II, it is also plausible that a difference in prescribing practices between hospitals could explain the observed results, rather than a difference between the drugs themselves. Further comparative studies will be necessary.

Learning Objectives:

Review the Society of Critical Care Medicine (SCCM) guideline recommendations on first-, second-, and third-line vasopressors for shock.
Identify the differences in mechanism of action and adverse effect profile of phenylephrine compared to angiotensin II.

Self Assessment Questions:

Which vasopressor is recommended by the SCCM guidelines as a second-line agent?
A. Phenylephrine
B. Norepinephrine
C. Vasopressin
D. Angiotensin II
How does angiotensin II work to improve MAP in patients presenting with shock?
A. Mimics the effects of antidiuretic hormone
B. Activates the renin-angiotensin-aldosterone system (RAAS)
C. Stimulates beta-1 and alpha receptors
D. Stimulates alpha receptors only
Q1 Answer: C Q2 Answer: B

Impact of management with or without phenobarbital on need for mechanical ventilation in patients with severe alcohol withdrawal

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year. Mild AWS may be treated with supportive care alone. For patients with moderate to severe AWS, the American Society of Addiction Medicine currently recommends symptom triggered management with benzodiazepines as the first line treatment for AWS. However, patients with severe alcohol withdrawal syndrome (SAWS) may require additional pharmacologic interventions, such as phenobarbital, when benzodiazepines fail. Phenobarbital has several advantages, including a longer half-life, compared to most benzodiazepines, and unique mechanism of action. Previous studies have associated phenobarbital with potential benefits in efficacy when compared to benzodiazepines alone. Despite its promising pharmacokinetic and pharmacodynamic profile, some providers remain uncomfortable with phenobarbital for SAWS due to fear of respiratory depression, ultimately leading to mechanical ventilation. Literature thus far has not directly addressed this aversion to phenobarbital use in AWS. The current study seeks to compare the incidence of mechanical ventilation in patients at risk for SAWS between those treated with and without phenobarbital.

Methods: Patients with a diagnosis code for AWS during their admission were retrospectively reviewed to assess eligibility. Those who met inclusion criteria were â‰¥18 years of age, had at least one risk factor for SAWS, and received treatment with benzodiazepines with or without at least one dose of phenobarbital. Patients were excluded if they were pregnant, admitted to inpatient psychiatry, or mechanically ventilated before receiving the study medication. The primary outcome was incidence of mechanical ventilation. Secondary outcomes included duration of mechanical ventilation, average Clinical Institute Withdrawal Assessment for Alcohol revised scoring, average daily Richmond Agitation Sedation Scale score for intubated patients, incidence and length of ICU admission, benzodiazepine requirements, and dexmedetomidine requirements.

Results and conclusion: To be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:
Discuss the potential advantages and disadvantages of phenobarbital as compared with benzodiazepines in patients at high risk for severe alcohol withdrawal.
Identify patients that may benefit most from treatment with phenobarbital rather than benzodiazepines alone.
Self Assessment Questions:
Current literature comparing phenobarbital to benzodiazepines for AWS has found a correlation between phenobarbital and:
A. Decreased efficacy over benzodiazepines alone
B. Increased ICU length of stay compared to benzodiazepines
C. Increased incidence of mechanical ventilation compared to benzodiazepines
D. Decreased incidence of ICU admission compared to benzodiazepines
Which of the following factors indicate a patient is at high risk for severe alcohol withdrawal?
A. Previous alcohol withdrawal seizures
B. Male who drinks 1-2 beers every other day
C. No previous alcohol withdrawal history
D. History of seizure disorder unrelated to alcohol withdrawal
Q1 Answer: D Q2 Answer: A

Implementation of a pharmacist-led, health literacy workflow to optimize patient care outcomes in the acute care setting at a community hospital

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Purpose:
Health literacy continues to be considered an opportunity for health care improvement as shown through the health literacy-related objectives in Healthy People 2030 from the US Office of Disease Prevention and Health Promotion. Inadequate health literacy has been shown to negatively affect a patientâ€™s health by increasing the risk of preventative healthcare under-utilization, worsening chronic disease state management, and preventable hospitalizations. In the fall of 2022, Parkview Health created and implemented a pharmacist-led workflow to assess health literacy using the validated REALM-Short Form (REALM-SF). Those with low health literacy according to REALM-SF were provided medication education cards written at a third to fourth grade reading level and additional verbal counseling as needed. This study evaluated the impacts of the new workflow pilot on re-admissions and emergency department (ED) visits at a community hospital.
Methods:
This was a retrospective chart review to assess the newly implemented health literacy workflow at Parkview Hospital Randallia. The collected data included one cohort before implementation and one cohort after implementation. The pre-implementation data collection timeframe was July 26, 2021, to March 30, 2022. The post-implementation data collection timeframe was July 26, 2022, to March 30, 2023. Information was collected on hospital admissions and emergency department visits. Included patients were English speakers and 18 years and older. Prior to workflow implementation, included patients were admitted with primary treatment diagnosis of chronic obstructive pulmonary disease, congestive heart failure, pneumonia, and diabetes. Post-implementation, patients were screened during the health literacy workflow. The primary endpoint was the 90-day re-admission and/or ED visit rate in the post-implementation cohort compared to the pre-implementation cohort.
Results and Conclusion:
Results and conclusion will be presented during the Great Lakes Pharmacy Resident Conference.

Learning Objectives:
Recognize the importance of addressing health literacy in patient care outcomes
Review where the pharmacist-led health literacy workflow improved and impacted re-admissions and emergency department visits
Self Assessment Questions:
What percentage of subjects in the 2003 National Assessment of Adult Literacy had proficient health literacy?
A. 0.54
B. 0.25
C. 0.12
D. 0.66
Which of the following patient care outcomes related to health literacy is used to measure the impact of the pharmacist(s) on patientsâ€™ health
A. Hospitalizations
B. Utilization of preventative health measures
C. Chronic disease state management
D. Medication adherence
Q1 Answer: C Q2 Answer: A

EFFICACY AND SAFETY OF INSULIN LISPRO 5 UNITS VS 10 UNITS FOR HYPERKALEMIA
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Background: Hyperkalemia is an electrolyte abnormality that occurs in up to 10% of patients presenting to the emergency department (ED) and can increase risk of cardiac arrhythmias and mortality. Medical treatment often includes intravenous (IV) calcium, inhaled beta2-adrenergic agonists, and a combination of IV insulin and glucose. Clinical controversy exists regarding the ideal dose of insulin for hyperkalemia due to hypoglycemia risk. Insulin lispro is the preferred agent at IU Health for hyperkalemia. It has a shorter, less variable half-life and minimal, transient risk of hypoglycemia in patients with renal dysfunction. To our knowledge, there are no studies evaluating the safety and efficacy of insulin lispro for hyperkalemia.

Statement of Purpose: The purpose of this study is to evaluate the change in serum potassium between insulin lispro 5 versus 10 units for hyperkalemia treatment.

Methods: This is a retrospective cohort study evaluating adult patients treated with IV push insulin lispro from the ED Hyperkalemia Order Set at all Indiana University Health Hospitals from January 2017 to January 2022. The primary endpoint is change in serum potassium between 5 and 10 units of insulin lispro for the treatment of hyperkalemia. Secondary safety endpoints include incidence of hypoglycemia, defined as a blood glucose <70 mg/dL, and severe hypoglycemia, defined as a blood glucose <40 mg/dL. An additional subgroup analysis will be conducted for primary and secondary endpoints for patients with a creatinine clearance <60 mL/min. Statistical analysis of continuous data will include a T-test or Mann Whitney U test, contingent on normality. Categorical data will be analyzed by Chi-Square or Fischerâ€™s Exact tests, depending on the number of observations for each respective group.

Results/Conclusion: Data collection is ongoing. Results and conclusions will be presented at the 2023 Great Lakes Pharmacy Resident Conference.

Learning Objectives:
Describe the mechanism of insulin in the treatment of hyperkalemia
Discuss pharmacokinetic and pharmacodynamic characteristics of insulin lispro
Self Assessment Questions:
Insulin is a mainstay of hyperkalemia treatment due to which of the following mechanisms?
A. Shifts potassium intracellularly via activation of sodium-potassium ATPase
B. Stabilizes the cardiac resting membrane potential reducing cardiac arrhythmias
C. Binds to potassium in the lumen of the gastrointestinal tract increasing fecal excretion
D. Indirectly stimulates the hydrogen-potassium pump by alkalinizing the serum
Which of the following is true regarding the pharmacokinetic and pharmacodynamic characteristics of insulin lispro?
A. Hypoglycemia is more common with insulin lispro due to the unpredictable duration of action compared to insulin regular products.
B. The half-life of insulin lispro is longer and more variable compared to insulin regular, potentially delaying movement of potassium into the cell.
C. Compared to regular insulin, kidney dysfunction has a more significant impact on elimination of insulin lispro, prolonging duration of action in patients with chronic kidney disease.
D. Hypoglycemia in patients with kidney injury is minimal and transient with insulin lispro, as its elimination is impacted to only a small degree by kidney dysfunction.
Q1 Answer: A Q2 Answer: D

Implementation of a Pharmacist-Driven Tobacco Cessation Protocol in an Academic Safety-Net Health System
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Purpose: Cigarette smoking is one of the leading causes of preventable disease, disability, and death in the United States. To decrease tobacco use, statewide protocols have been implemented in 17 states to provide pharmacists with prescriptive authority for tobacco cessation medications, increasing patient access. Limited research has been conducted after implementation of statewide protocols. This study looks to assess pharmacist knowledge and comfort after formal tobacco cessation education. It will also assess effectiveness of a pharmacist-driven tobacco cessation protocol within an academic, safety-net health system in terms of patient reach and access to medications.

Methods: A mixed methods approach will be used combining qualitative and quantitative assessment with a retrospective cohort study. Retrospective data will be collected for a six-month period prior to implementation of a pharmacist-driven protocol (January 1st to June 30th, 2022) and will be compared to data for six months following implementation (January 1st to June 30th, 2023). Pharmacists completed a formal 2-hour tobacco cessation education program, each receiving a survey with questions about their knowledge and comfort level with tobacco cessation medications before and after the programming. De-identified pre- and post-surveys will be linked for data analysis based on a unique code. Retrospective cohort will include: any outpatient filling at least one tobacco cessation prescription at Eskenazi Health St. Margaretâ€™s Pharmacy with at least one primary care appointment within 12 months before their fill date. Primary endpoint of this study is overall pharmacist assessment scores (composite of comfort level and knowledge base) before and after completion of a formal education program. Secondary endpoints will include individual pharmacist comfort and knowledge scores, percentage of patients offered tobacco cessation therapy, patient reach, and those who filled prescriptions for tobacco cessation therapy before and after implementation of the protocol.

Results: To be collected.

Conclusions: Data collection is on-going.

Learning Objectives:
Describe the gaps in literature regarding tobacco cessation programs.
Discuss implementation and evaluation of a pharmacist-driven tobacco cessation protocol.
Self Assessment Questions:
Which of the following settings most represents a gap in published studies regarding tobacco cessation programs?
A. Physicians prescribing tobacco cessation therapy
B. Independent pharmacist prescribing of tobacco cessation therapy based on a standing order
C. Interdisciplinary approach to tobacco cessation services within a community pharmacy
D. Tobacco cessation programs within cancer treatment centers
According to the Indiana standing order, how soon after tobacco cessation therapy initiation do pharmacists need to follow up with patients?
A. 1 week
B. 2 weeks
C. 3 weeks
D. 4 weeks
Q1 Answer: B Q2 Answer: B

Recurrent VTE with Xarelto vs. Eliquis: Battle of the Fancy Oral Anti-Coagulants

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patients. Occurring every 1 in 5 patients, it is the second leading cause of death. The risk of VTE increases for a few different reasons including patient, cancer, and treatment-related risk factors. Treatment options for VTE include low molecular weight heparin (LMWH), direct oral anticoagulants (DOACs) including apixaban, rivaroxaban, edoxaban, and warfarin. Currently, the preferred treatment option is a DOAC except for patients with gastric or gastroesophageal malignancies. DOACs predispose these patients to a higher chance of bleeding. Multiple studies show that DOACs are good options for patients with cancer. However, there has not been a head-to-head study comparing both rivaroxaban and apixaban in cancer patients. Since these two agents are the more commonly prescribed DOACs, the focus is to describe their use for cancer-related VTE.
Objective: The purpose of this study is to quantify the recurrence rate of VTE among cancer patients receiving apixaban or rivaroxaban for VTE treatment.
Methods: This is a single-center, retrospective cohort study conducted at an academic hospital including adult patients admitted between September 1, 2021 â€“ March 31, 2022, with a cancer diagnosis being initiated on apixaban or rivaroxaban for VTE treatment. Patients will be excluded if they have a history of VTE, prior anticoagulant use, are part of a vulnerable population, have CrCl < 30 ml/min, and have gastric or gastroesophageal malignancies. Primary endpoint evaluates the rate of VTE recurrence while on treatment with apixaban or rivaroxaban for VTE indication. Secondary endpoints include frequency of major bleeding/clinically relevant non-major bleeding, all-cause mortality, readmission rate due to VTE, time to readmission, visit to urgent care and/or emergency department, rate of non-adherence, and rate of drug-drug interactions.
Results/Conclusions: Will be presented at the conference.
Learning Objectives:
Discuss the pathogenesis of venous thromboembolism

Describe the current treatment options for VTE in cancer patients

Self Assessment Questions:

Which of the following is not a risk factor for developing VTE?

A. Surgery
B. Smoking history
C. Low body weight
D. Pancreatic cancer

Which of the following is not a treatment option for VTE in patients with cancer?

A. Rivaroxaban
B. Enoxaparin
C. Apixaban
D. All of the above are treatment options

Q1 Answer: C Q2 Answer: D

Evaluation of Use of Intravenous (IV) Buprenorphine for Cancer Pain at a Large Academic Medical Center

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Background: Buprenorphine has been shown to be effective for both pain management and opioid use disorder (OUD), and can be a safer option compared to full agonist opioids with regards to adverse effects. Despite its favorable side effect profile, buprenorphineâ€™s complex, and often misunderstood, pharmacology has caused this medication to be under-utilized for cancer-associated pain.

Purpose: To analyze the current prescribing practices and dosing patterns of intravenous (IV) buprenorphine for pain at The Ohio State University Comprehensive Cancer Center prior to and following formulary restriction changes.

Methods: This was a single-center, retrospective review of IV buprenorphine over 6 months. The primary outcomes included identifying the most utilized IV buprenorphine dose for pain, assessing the percentage of doses increased/decreased/maintained, evaluating the number of patients who were on concomitant full agonists in addition to buprenorphine, and if precipitated withdrawal was documented. The secondary outcomes of this study included assessing why buprenorphine was selected in these patients as opposed to other opioids, quantifying the number of oral morphine equivalents (OMEs) used per patient in addition to IV buprenorphine, and evaluating if formulary restrictions adjustments (made in July of 2022) impacted IV buprenorphine administrations.

Results/Conclusion: A total of 215 patients were treated with IV buprenorphine for pain to total 2,689 administrations in 6 months. IV buprenorphine was observed to be most utilized in patients with a history of substance use disorder/opioid use disorder or if there was a concern for central nervous system side effects such as somnolence, altered mental status, or hepatic encephalopathy. Most of our institutionâ€™s starting IV buprenorphine doses are kept the same during the patientâ€™s admission, indicating appropriate IV buprenorphine dosing practices for pain management.

Learning Objectives:

Describe the mechanism of buprenorphine and its unique pharmacology in comparison to other opioids.
Identify populations where intravenous buprenorphine is preferentially utilized in comparison to full agonist opioids

Self Assessment Questions:

Which receptors do buprenorphine act on?

A. Mu opioid receptor full agonist only
B. Mu opioid receptor partial agonist and kappa antagonist
C. Mu opioid receptor full agonist and kappa antagonist
D. Kappa antagonist only

What starting dose is recommended by intravenous buprenorphineâ€™s package insert?

A. 0.3 mg every 6 to 8 hours
B. 0.15 mg every 6 to 8 hours
C. 0.6 mg every 6 to 8 hours
D. 0.9 mg every 6 to 8 hours

Q1 Answer: B Q2 Answer: A

Evaluating Springfield Memorial Hospital's Emergency Department Concordance with the 2010 IDSA Guidelines for Acute Uncomplicated Cystitis

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Acute uncomplicated cystitis is one of the most common outpatient indications for antibiotic exposure to an otherwise healthy population. Despite the 2010 Infectious Diseases Society of America (IDSA) clinical practice guidelines providing strong recommendations for treatment, studies have shown only a 58 - 64% guideline adherence. The results from this study can provide information about prescribing practices and subsequently identify opportunities for improved antibiotic prescribing.
This single-center, retrospective, observational study evaluates prescribing practices for acute uncomplicated cystitis from the emergency department (ED) at Springfield Memorial Hospital from June 2019 to June 2022. Guideline adherence is defined as a prescription of a first-line agent (nitrofurantoin, trimethoprim-sulfamethoxazole, or fosfomycin) with the recommended duration as outlined in the 2010 guidelines. Data collected includes antibiotic and culture information, present or absence urinary symptoms, antibiotic allergies, and pharmacist or provider intervention during the initial visit or required after discharge.
Women 18-50 years of age diagnosed with uncomplicated cystitis and discharged from the ED with an oral antibiotic will be included in the study. Patients with complicated cystitis (as defined in the 2010 IDSA guidelines), pyelonephritis, recurrent uncomplicated cystitis, concurrent sexually transmitted disease, and/or those prescribed urinary tract infection prophylaxis will be excluded from the study.
The primary outcome will analyze failure rates between patients prescribed a first-line agent and those that were prescribed a non-first-line agent. Failure is defined as either the patient presenting to Springfield Memorial Hospital ED within 2 weeks of initial visit for continued urinary symptoms or those who required intervention by an ED provider following discharge. Secondary outcomes include the percentage of patients in which a non-first-line agent was susceptible to the organism cultured, percentage of patients prescribed a first-line agent with incorrect duration, and percentage of patients with pharmacist intervention before discharge.

Learning Objectives:
Identify the guideline recommended treatment for patients with acute uncomplicated cystitis in regards to agent and duration.
Recognize the significance of prioritizing certain antibiotics for the treatment of acute uncomplicated cystitis.
Self Assessment Questions:
Per the 2010 IDSA Guidelines for the Treatment of Uncomplicated Cystitis and Pyelonephritis, which treatment plan is recommended as first-line therapy for the treatment of acute uncomplicated cystitis?
A. Trimethoprim-sulfamethoxazole for 5 days
B. Fosfomycin for 3 days
C. Nitrofurantoin for 5 days
D. Cephalexin for 5 days
Which class of antibiotics are not preferred for the treatment of acute uncomplicated cystitis due to their increasing rates of resistance and potential harm to patients?
A. Penicillins
B. Cephalosporins
C. Fluoroquinolones
D. None of the above
Q1 Answer: C Q2 Answer: C

Evaluation of Efficacy and Toxicities of Venetoclax Based Therapies in Patients with Myeloid Malignancies

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Purpose: Acute myeloid leukemia (AML) is one of the most common types of leukemia diagnosed in adults. Venetoclax based therapy is a first line treatment for patients unable to tolerate intensive chemotherapy and is also utilized in the relapsed setting. Early quality improvement review shows patients receiving venetoclax based therapies for AML at UW Health are having less optimal outcomes as compared to the FDA approval data, which is consistent with published findings that have shown sub-optimal outcomes in the real-world setting compared to that of clinical trials. The purpose of this project is to evaluate operational, patient specific, and supportive care factors specific to venetoclax based treatment courses in patients with myeloid neoplasms at UW Health. Findings will support efforts of the myeloid disease team to implement and update tools to improve patient care.
Methods: In this IRB approved retrospective research study, patients diagnosed with myeloid neoplasms initiated on treatment with venetoclax plus a hypomethylating agent at UW Health will be included for analysis. Operational factors to be assessed include time from diagnosis to initiation of treatment, cycle modifications, and time between initiation of venetoclax and hypomethylating agent. Patient specific factors include patient location, clinical site of care (academic center versus regional affiliate), diagnosed myeloid subclass, blast percentage, and white blood cell count at diagnosis. Supportive care factors include azole antifungal use and granulocyte colony-stimulating factor (GCSF) use. Study data will be collected from pharmacy databases and electronic health records. The primary endpoint of this study will be overall survival. Bonferroni analysis will be utilized to control for statistical significance of multiple comparisons by chance. A forest plot will be used to visually display the subgroup analysis.
Results/Conclusion: Full results to be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:
Identify operational, patient specific, and supportive care factors impacting overall survival in patients with myeloid neoplasms who receive venetoclax based therapy.

Outline tools to improve care for patients with myeloid neoplasms as clinically appropriate.

Self Assessment Questions:

According to the package insert, what is the recommended venetoclax dose reduction when administered with azole antifungal prophylaxis?

A. 100 mg
B. 70 mg
C. 200 mg
D. 400 mg

Venetoclax in combination with which of the following agents is approved for use in acute myeloid leukemia (AML)?

A. Low-dose cytarabine (LDAC)
B. Azacitidine
C. Decitabine
D. All of the Above

Q1 Answer: B Q2 Answer: D

Role-out of Pharmacist Discharge Medication Reconciliation Review Procedure

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Background/Purpose: A standardized process does not exist for pharmacists to conduct discharge medication reconciliation reviews within the SSM Health System. Literature shows that pharmacist involvement in discharge medication reconciliations has a positive impact on patient care by reducing discrepancies on patient medication lists, readmission rates, and emergency department visits. Variability exists in the process by which pharmacists review discharge orders within the SSM Health System. By implementing a standardized pharmacist discharge medication reconciliation review process, the goal is to reduce omissions and duplications, and ensure appropriateness of therapy. We aim to improve continuity of care for patients, while reducing readmissions and improve transition of care to outpatient providers.

Methodology: Baseline 30-day unplanned readmission data was collected for the SSM Health Wisconsin Region ministries. With input from region ministries, a standardized pharmacist discharge medication reconciliation review created by SSM Health System Transitions of Care Committee which will be implemented at all SSM Health Wisconsin region ministries beginning Feb 28. Post implementation data will be collected on interventions made during the intervention period as well as 30-day unplanned readmission rates. Furthermore, interventions will be categorized as inadvertent discontinuation, contraindication, dose adjustment, gap in therapy, medication selection, drug-drug interactions, duplicate therapy, drug allergy, therapy no longer necessary, or other. We will identify the greatest areas of impact, through the interventions made, and address common discrepancies through education to providers.

Learning Objectives:

Describe the effect a pharmacist can have on transitions of care.
Recall the primary outcome measures of this study

Self Assessment Questions:

Which of the following is correct regarding pharmacists effect on transitions of care?

A. Improved handoff to outpatient providers for hospital follow-up.
B. Decreased accuracy of home medication lists.
C. Increased discrepancies on patient's after visit summary on discharge.
D. Decreased communication with multi-disciplinary treatment team.

Which of the following are the primary outcome measures of this study?

A. Medication discontinuation and number of patients counseled.
B. 90-day unplanned readmissions and average readmission risk.
C. 30-day unplanned readmissions and interventions made.
D. Percent of patients reviewed on discharge and time to next readmission.

Q1 Answer: A Q2 Answer: C

Evaluation of Near-Peer Teacher Experience within Pharmacy Skills Laboratories

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Purpose:
Within pharmacy education, there has been a push to innovate how pharmacy students are taught and how they best receive material. One particular method of educating that is gaining more attention in the academic and clinical setting is near-peer teaching. Near-peer teaching incorporates two learners, one being at least one year senior in their education. The senior learner is designated the near-peer teacher (NPT), and the junior learner is designated the near-peer learner (NPL). The benefits of this model of teaching in the pharmacy skills lab setting may include less anxiety for students when being evaluated and taught by a near-peer, and more teaching and mentorship opportunities for NPTs. What remains unclear in current research is best practices in regards to incorporating NPTs into pharmacy skills lab.
Methods:
This survey-based study will be conducted using Qualtrics (Qualtrics, Provo, UT) to administer a multi-item survey that will be sent to each pharmacy skills laboratory coordinator in the Big10 Academic Alliance to then distribute to participants in pharmacy skills laboratory that acted as NPTs during the fall semester of 2022. The NPTs identified will be Advanced Pharmacy Practice Experience (APPE) students, pharmacy residents, and pharmacy fellows. No personal or identifying data will be collected or stored. Participants will be questioned on their demographics and experiences with teaching in the skills lab setting. Data will be analyzed primarily using descriptive statistics.
Results/Conclusion:
Data collection and analysis is currently ongoing with the results and analysis expected to be presented at the Great Lakes Pharmacy Residents Conference. With the results of the survey, the authors hope to identify best practices when incorporating NPTs in the pharmacy skills lab setting.

Learning Objectives:
Identify potential benefits and limitations of using NPTs in pharmacy skills lab
Describe possible activities and tasks in pharmacy skills lab that most benefit NPTs in their education process
Self Assessment Questions:
Which of the following is an example of near-peer education?
A. A PGY-2 pharmacy resident teaching another PGY-2 pharmacy resident
B. A faculty member teaching a P2 pharmacy student how to dose vancomycin
C. An APPE pharmacy student demonstrating to a P2 student how to take blood pressure
D. A pharmacist providing guideline updates to a medicine team
What are possible limitations of utilizing NPTs in pharmacy skills lab?
A. Time commitment for NPTs
B. Lack of confidence by the NPTs in the material they are teaching
C. Concern with the quality of education that NPTs are providing
D. All of the above
Q1 Answer: C Q2 Answer: D

Effect of time to therapeutic vancomycin area under the curve on clinical outcomes in hospitalized patients with MRSA pneumoniaÂ Â

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Background:

Methicillin-resistant Staphylococcus aureus (MRSA) is considered a serious threat and is one of the leading causes of nosocomial pneumonia (PNA). In hospitalized patients, MRSA PNA is commonly treated with vancomycin (VAN) for 7-14 days using area under the curve to minimum inhibitory concentration (AUC/MIC), with a goal of 400-600, as the gold standard for monitoring. There is no published literature to our knowledge regarding MRSA PNA and the association between clinical outcomes and time to achieving vancomycin AUC/MIC goals.

Purpose:

To evaluate the relationship between time to therapeutic VAN AUC/MIC and clinical outcomes in hospitalized patients with MRSA PNA and determine whether a duration of 7 days is adequate or should be extended.

Methods:

This was a retrospective cohort study of adult patients with MRSA PNA treated with at least 7 days of VAN at the Ohio State University Wexner Medical Center. Patients were excluded if they lacked a steady state VAN trough, died within 48 hours of index culture, had complicated PNA, or required VAN dosing less frequent than every 24 hours.

The primary outcome is composite 7-day clinical response (defined as improvement in signs and symptoms of infection, absence of fever for 24 consecutive hours after VAN initiation, and normalization of leukocytosis). Secondary outcomes include incidence of mechanical ventilation and ventilator days, ICU and hospital length of stay, microbiologic cure, 30-day MRSA PNA recurrence, and 30-day all-cause mortality. Classification and regression tree analysis (CART) will be conducted to identify the time to therapeutic VAN AUC/MIC threshold that predicts clinical response. Separate CART analyses are planned a priori for general and critical care populations to compare this threshold to the aggregated population.

Results/Conclusion: Data analysis is ongoing, and results will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify the goal vancomycin AUC/MIC for MRSA pneumonia.

Describe the impact of time to therapeutic vancomycin AUC/MIC on MRSA PNA clinical outcomes.

Self Assessment Questions:

Which of the following PK/PD parameters best predicts vancomycin efficacy and toxicity?

A. Trough/MIC
B. AUC/MIC
C. Peak/MIC
D. Time/MIC

What is the IDSA guideline-recommended AUC/MIC goal for vancomycin in serious MRSA infections?

A. 200-400 mg*h/L
B. 200-600 mg*h/L
C. 400-600 mg*h/L
D. 400-800 mg*h/L

Q1 Answer: B Q2 Answer: C

Implementation of a Digital Patient Engagement Pilot in a Health System Specialty Pharmacy

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Purpose: Digital engagement tools, such as secure messaging, are increasingly being incorporated throughout healthcare, including within electronic health records (EHR). Health system specialty pharmacies (HSSP) can use secure messaging for monthly clinical assessments (MCA) as an alternative to phone calls. At our HSSP, MCAs are administered to patients via telephone to assess medication tolerability, safety, adherence, and efficacy prior to each refill. A pilot program was established to evaluate secure messaging to administer MCAs.

Methods: The Epic Hyperspace EHR has secure two-way messaging functionality for patients and providers called MyChart. Using MyChart, specialty pharmacy patients will complete the MCA and set up a delivery for their medication. Eligible patients include English-speaking patients 18 years of age or older with an active MyChart account who are receiving a specialty medication from our HSSP within the selected timeframe. The current telephone-based MCA was built into the EHR. For initial enrollment, a MyChart message is sent to eligible patients. For those who enroll, MCAs are sent 5 days prior to when medication is due for refill. When the patient completes the MCA, the responses are maintained within the EHR, reviewed, and medication delivery is scheduled. If a medication concern is identified, the MCA is escalated to a pharmacist for an intervention. If the MCA is not completed within 2 days of being sent, a technician or pharmacist will contact the patient via phone. This is a retrospective review of data collected during the pilot timeframe (10/2022 â€“ 02/2023). Data collected from this pilot program will measure MCA enrollment, patient response time, number of pharmacist interventions, and patient and staff satisfaction with MyChart MCA messaging.

Results: To date, 43 patients have been enrolled in the MyChart MCA program. Final results will be presented at the 2023 Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Define digital patient engagement tools.

Recognize the benefits of utilizing digital patient engagement tools in a Health System Specialty Pharmacy (HSSP).

Self Assessment Questions:

Which of the following is a form of digital patient engagement?

A. Sending letters to a patients place of residence

B. In-person counseling.

C. Text messaging for refill notifications.

D. Print outs of injection instructions.

Which of the following is a benefit of utilizing a digital engagement tool to complete monthly clinical assessments?

A. Increased patient satisfaction with offered services.

B. Decreased efficiency of processing surveys.

C. Increased time spent on the phone.

D. Decreased staff satisfaction with processing surveys.

Q1 Answer: C Q2 Answer: A

College-aged students' motivators and barriers to use a pharmacy-based travel health consultation service

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Purpose: In 2019, international travel increased 4% from the prior year to 1.5 billion travelers. With this increase comes an increase in the spread of diseases resulting in the need for travel health services. The primary objective of this study is to identify college-aged studentsâ€™ motivators and barriers to use a travel health service when traveling abroad. The secondary objective is to identify demographic characteristics and medication beliefs associated with utilization of such service.

Methods: Students attending Purdue University, who are 18 years of age or older, and receive prescriptions from the Purdue University Pharmacy, are eligible to participate in this study. Cashiers will notify students about the study and invite them to participate while waiting on their prescriptions. Once notified, participants will receive a flyer with detailed information about the study and a QR code to a survey. To track the number of students given the opportunity to take the survey, the difference will be calculated between the number of flyers available in the morning and those remaining at the end of the day. After the survey is complete, students will have the option to enter a raffle for a $20 gift card. The health belief model will be utilized as the framework for this study. The 69-item survey consists of four sections and includes: 1) participant demographics, 2) previous use of travel health services, 3) perceived severity and susceptibility to infection, and 4) motivators (benefits)/barriers to the use of a travel health services. Respondents will rate their level of agreement to each item using a seven-point Likert-type scale (1=strongly disagree to 7=strongly agree). Descriptive statistics will be performed and normality of the data will be assessed. Nonparametric or parametric statistics will be utilized for comparisons.

Results/conclusions: To be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Define travel health services and its components

Identify patients' motivators and barriers to utilizing travel health services

Self Assessment Questions:

All of the following options are available to patients in a travel health consultation EXCEPT:

A. Administration of a yellow fever vaccine
B. Prescription for prophylactic malaria medication
C. Prescription for an antibiotic for a current infection
D. Informational handout to help prevent altitude sickness

Which of the following options are barriers to patients considering the use of travel health services?
A. Cost of the service
B. Fear of needles
C. Time required for the consultation
D. All of the above

Q1 Answer: C Q2 Answer: D

Development of an opioid stewardship program for IV and oral opioids to improve safe prescribing of opioids and identify high risk patients.

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I. Statement of Purpose
To develop or enhance tools designed to improve pharmacy stewardship for IV and oral opioids and identify high risk patients

II. Statement of Methods Used
A literature review was done to establish the most common risk factors affecting patients receiving opioids and were organized on an impact-effort matrix with input from the clinical informatics pharmacists. The risk factors were classified into interventions that could be made and selected based on the highest impact on preventing opioid related side effects and overdose.

III. Summary of (preliminary) results to support conclusion
The selected risk factors to be included in this quality improvement project are as follows: patients receiving more than one opioid per route, patients who have an opioid order without a bowel regimen, and patients receiving long-acting opioids within five days of beginning acute opioid treatment. Other interventions identified as candidates for improvement include improving the pain assessment tool and performing a review of naloxone administrations to identify the most common use reasons. Three interventions are made as part of the project. The first two are best practice alerts at the point of medication verification. They address the prescribing of multiple opioids for the same route of administration and prescribing a long-acting opioid during the first five days of acute pain. Pharmacists will review the chart, discuss with the prescribing physician, and recommend alternatives if appropriate. A drug therapeutic monitoring alert (DTM) is being implemented and added to the existing grid for patients prescribed opioids without a bowel regimen. Pharmacists will evaluate these patients as part of their daily workflow. The pain assessment view is being updated, removing redundant information. Finally, a naloxone review is being completed, reviewing the most common indications of naloxone use.

IV. Conclusions Reached
Final conclusions to be presented at the Great Lakes Pharmacy Resident Conference

Learning Objectives:
Review opioid overdose symptoms and side effect profile
Describe common interventions that can improve opioid stewardship

Self Assessment Questions:
Which of the following is a common side effect of opioid use?
A. Hypertension
B. Tachypnea
C. Constipation
D. Insomnia

Which of the following interventions is most helpful when reviewing a patient chart for opioid stewardship?
A. Naloxone being ordered for every patient.
B. Implementing multiple interruptive alerts when patients are prescribed more than one opioid, regardless of route or appropriateness.
C. The patient vital signs and the current opioid regimen only being available on separate areas of the patient chart.
D. Implementing an interruptive alert during verification when a long acting opioid is prescribed in the first five days of acute opioid treatment

Q1 Answer: C Q2 Answer: D

Impact of Pharmacist-Managed Diabetes Medication at a Chronic Care Clinic in a Rural Community

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Purpose: Diabetes is a chronic, metabolic disease that is characterized by elevated blood glucose, which can lead to serious damage to organs over time. Hemoglobin A1c, also known as glycated hemoglobin, is a lab used to evaluate the level of glucose control over the past 3 months and represents the average blood glucose. Pharmacists play an important role in managing therapy in patients with diabetes, which can lead to improvement in patient care. The purpose of this retrospective study is to evaluate if patients enrolled in a pharmacist-led chronic care medication management clinic had an overall change in A1c.

Methods: This study is a single center, retrospective, chart review studying the impact of pharmacist-managed diabetes medication in a rural community. Patients seen from August 2020 to August 2021 at the chronic care medication management clinic with a diagnosis of diabetes and a referral for diabetes medication management will be included in the analysis. Exclusion criteria include loss to follow-up, patients not referred for diabetes management, and patients without recorded A1c. Data collection forms will be utilized to compile patient demographic data and A1c results with associated dates. The primary outcome of this review is to evaluate A1c changes in patients enrolled in the chronic care medication management clinic. Secondary outcomes of this study include determining if patients received medication refills in a timely manner and if patients experienced a hospitalization related to diabetes during this time. Statistical analysis will be utilized to determine A1c changes, medication refill adherence, and rate of hospitalizations due to complications of diabetes.

Results/ Conclusions: This study is in progress. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:
Identify 1. Identify patterns of A1c improvement in patients enrolled in chronic care medication clinic
Discuss 2. Discuss the methods to improve patient adherence and access to medication refills
Self Assessment Questions:
1. Which of the following statements is true regarding the incidence of diabetes in Appalachian and non-Appalachian counties?
A. Appalachian counties have a 17% adult rate of diagnosis for diabetes compared to 12% in non-Appalachian counties
B. Non-Appalachian counties have a 17% adult rate of diagnosis for diabetes compared to 12% in Appalachian counties
C. The adult rate of diabetes diagnosis is similar in Appalachian and non-Appalachian counties
D. A direct comparison cannot be made
Which of the following statements is true regarding the incidence of diabetes in Kentucky?
A. Kentucky ranks 10th highest in the U.S. for diabetes prevalence
B. Kentucky ranks 10th lowest in the U.S. for diabetes prevalence
C. Kentucky ranks 8th highest in the U.S. for diabetes prevalence
D. Kentucky ranks 8th lowest in the U.S. for diabetes
Q1 Answer: A Q2 Answer: C

The Impact of Clinical Pharmacists on Contraceptive Services at Federally Qualified Health Centers

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Purpose: In Indiana, nearly half of all pregnancies are unintended, there is a pending near-total abortion ban law, and maternal mortality rates are among the highest in the country. Unintended pregnancies are linked to adverse maternal and child health outcomes and other social and economic challenges. Contraception is an effective way to prevent pregnancy and may have additional health benefits. The aim of this study was to improve access to sexual and reproductive health services, starting with increased contraceptive services in a state where legislation does not yet permit pharmacist contraception prescribing. The objective of this study was to evaluate the impact on access to contraceptive services at two federally qualified health centers (FQHCs) when managed by pharmacists via collaborative practice agreement (CPA) compared to non-pharmacist providers.

Methods: This quantitative, retrospective, case-control study evaluates contraception access for patients 18 to 45 years of age. Case subjects had a pharmacist-managed contraception visit at the FQHC between January 2023 and March 2023, and was seen by any Eskenazi Health provider within the previous 12 months. Control subjects had discussed contraception with a non-pharmacist provider between January 2022 and March 2022. The primary outcome, comparison of access over 90 days, was measured by the number of comprehensive contraception visits and the number of contraceptives prescribed.

Results/Conclusions: Results will be presented at the Great Lakes Pharmacy Resident Conference. This study will help fill current gaps in literature surrounding the impact of pharmacists on contraceptive services in an FQHC. The data will allow the organization to assess the benefits of expanding this pharmacist-managed service across the health-system and adding a clinical pharmacist whose collaborative practice agreement includes other sexual and reproductive health services.

Learning Objectives:
Identify current gaps in the literature related to pharmacist-managed contraception services.
Review Eskenazi Healthâ€™s protocol for pharmacist prescribing of contraceptives
Self Assessment Questions:
What is not an identified gap in literature related to pharmacist-managed contraception services?
A. Data from safety-net health-systems
B. Contraception adherence data
C. Clinical pharmacists as providers of contraception services
D. Patient perspectives on pharmacist prescribing of contraceptives
Which of the following is considered an emergency contraceptive?
A. Medroxyprogesterone acetate
B. Etonogestrel
C. Ulipristal acetate
D. Spermicide
Q1 Answer: D Q2 Answer: C

Safety and Efficacy of Direct Oral Anticoagulants in Underweight Patients: a Multicenter, Retrospective, Observational Study
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Purpose: Direct oral anticoagulants are dosed using fixed dosing primarily based on indication and renal function. The patient populations used to test the safety and efficacy of these treatment regimens did not include a significant number of underweight patients. The purpose of this study is to assess the risk for major bleeding events of underweight patients (weight â‰¤ 60 kg or a BMI < 18.5 kg/m2) taking apixaban or rivaroxaban compared to those taking warfarin.

Methods: This is a multicenter, retrospective observational study including patients admitted to 21 Ascension sites across Michigan, Tennessee and Alabama from January 1, 2015 to December 31, 2021. The primary outcome is time to the first major bleeding event in patients who received apixaban or rivaroxaban for venous thromboembolism (VTE) or atrial fibrillation (AF) compared to those who received warfarin. Inclusion criteria are 18 years or older, weight â‰¤ 60 kg or BMI < 18.5 kg/m2, admitted with diagnosis of new onset or history of VTE or AF, received at least one dose of apixaban, rivaroxaban or warfarin and are discharged with a prescription. Patients will be excluded if they have severe liver disease, contraindicated concomitant medications, pregnancy, major bleeding upon initial admission, or valvular atrial fibrillation (defined as mechanical heart valve). Collected data will include sex, age, height, weight, BMI, serum creatinine, CBC, INR, platelets and hemoglobin, history of major bleeding and thromboembolism, comorbidities, concomitant medications, and trauma or surgical procedure upon admission.

Patients will be analyzed in a ratio of 2:1 apixaban or rivaroxaban to warfarin. The primary outcome will be assessed using a Kaplan-Meier curve and log rank test to analyze time to major bleeding event in 12 months.

Result/conclusion: Results and conclusions will be presented at the 2023 Great Lakes Pharmacy Resident Conference.

Learning Objectives:
Name the criteria to adjust the dose of apixaban and rivaroxaban based on disease state.
Identify FDA approved indications for apixaban and rivaroxaban.
Self Assessment Questions:
At which creatinine clearance is rivaroxaban dose adjusted for venous thromboembolism?
A. 50 mL/min
B. 40 mL/min
C. 30 mL/min
D. No dose adjustment necessary but not recommended for use below 30 mL/min
Which of the following is an FDA approved indication for apixaban?
A. Valvular atrial fibrillation
B. Peripheral artery disease
C. Non-valvular atrial fibrillation
D. Coronary artery disease
Q1 Answer: D Q2 Answer: C

Tolerability of Contemporary HFrEF GDMT when Initiated on Hospital Discharge

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The updated guidelines for the management of HFrEF (heart failure with reduced ejection fraction) now include SGLT2 (sodium-glucose cotransporter-2) inhibitors as cornerstones of mortality reducing therapy, so there has been a growing interest in initiating SGLT2 inhibitors either upon hospital admission or at discharge. Benefits of initiating GDMT in admitted patients include increased ability to monitor vital signs, labs, and improved adherence by addressing medication access and education barriers prior to discharge. Although there are substantial benefits to initiating quadruple therapy (renin-angiotensin aldosterone system (RAAS) inhibitor, mineralocorticoid antagonist (MRA), beta blocker (BB), and SGLT2 inhibitor) early, the long-term tolerability of this combination of therapies compared to conventional triple therapy (RAAS inhibitor, MRA, and BB) when initiated on hospital discharge remains unknown.

Methods:
This was a retrospective, single center, cohort study of patients discharged from UK HealthCare between June 5, 2021 and July 1, 2022. Patients were included if greater than 18 years of age, initiated on quadruple or triple therapy for the first time at discharge, and with a primary or secondary diagnosis of HFrEF. Patients were excluded if they had an ejection fraction greater than 40%, on quadruple or triple therapy prior to admission, were receiving intermittent hemodialysis, or with New York Heart Association functional class IV heart failure. The primary endpoint evaluated was tolerability, defined as continuation on the same prescribed regimen at follow up between 5 to 7 months after discharge, of quadruple therapy as compared to triple therapy. Secondary endpoints include ability to titrate medications toward goal doses, factors associated with decreased medication utilization, medication(s) that is/are discontinued due to intolerance, and hospital readmission and mortality within 6 months after discharge.

Results and Conclusions:
110 patients were included in this study. Preliminary data analysis will be presented at the Great Lakes Pharmacy Residents Conference.

Learning Objectives:
Describe literature supporting quadruple therapy in patients with heart failure with reduced ejection fraction (HFrEF).
Identify patient specific factors associated with increased and decreased tolerability of contemporary HFrEF guideline-directed medical therapy (GDMT) when initiated on hospital discharge.

Self Assessment Questions:
Which medication was most recently approved for patients with heart failure with reduced ejection fraction?
A. Dapagliflozin
B. Enalapril
C. Sacubitril-valsartan
D. Carvedilol
What is a common reason for not prescribing full guideline directed medical therapy in patients with heart failure with reduced ejection fraction?
A. Renal function
B. Body weight
C. Hepatic function
D. Young age
Q1 Answer: A Q2 Answer: A

Impact of a Novel Multi-disciplinary Outpatient Non-alcoholic Steatohepatitis Clinic

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Background
Non-alcoholic steatohepatitis (NASH) is a growing cause of liver disease and indication for transplant. NASH is associated with many metabolic conditions including obesity and dyslipidemia. To manage these comorbidities of NASH and potentially improve liver function, weight loss is recommended. Patients are encouraged to undergo diet and exercise changes to achieve weight loss, however some patients require pharmacotherapy intervention. To help patients lose weight, our center developed a multi-disciplinary clinic, including hepatologists, dietitians, a psychologist, a nurse coordinator, and pharmacists, to intervene. The aim of this study was to evaluate the efficacy and safety of weight loss pharmacotherapy intervention initiated through the NASH clinic.
Methods
This retrospective cohort study examined weight loss of patients enrolled in the NASH clinic versus those managed by a hepatologist prior to clinic development. Adult patients with non-alcoholic fatty liver disease or NASH and obesity seen between 2018 and 2022 were included. Patients were included in the intervention arm if initiated on weight loss medications and managed by the NASH clinic team as compared to management by a health-system hepatologist for the comparator group. Patients enrolled in clinical trials or undergoing bariatric surgery were excluded. The primary outcome assessed the proportion of patients in each group who achieved at least 5% weight loss at six months and was stratified by class of medication therapy used. Secondary outcomes were indicators of therapy success including average weight loss three months after medication initiation and at one year, metabolic benefits of therapy, adverse reactions, discontinuation rates, and weight loss resulting in transplant listing. Based on presumed effect size, this study aimed to enroll 154 patients. The primary outcome was analyzed using chi square test. Secondary outcomes were analyzed by appropriate statistical tests.
Results and conclusions will be presented at the conference.
Learning Objectives:
Identify the mechanism of action for common weight loss agents.
List adverse effects associated with weight loss medications.
Self Assessment Questions:
Which of the following medications is a GLP-1 receptor agonist?
A. Liraglutide
B. Orlistat
C. Phentermine
D. Topiramate
Hypertension is an adverse effect associated with which medication?
A. Liraglutide
B. Phentermine
C. Semaglutide
D. Topiramate
Q1 Answer: A Q2 Answer: B

Impact of an outpatient medication bedside delivery program on patient satisfaction of medication understanding: Pilot study.
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Background
Since the Hospital Readmissions Reduction Program establishment in 2012, many studies have attempted to determine the effect of outpatient medication bedside delivery programs (i.e., Meds-to-Beds or MTB) on 30-day hospital readmission rates. However, only a few studies considered patients' satisfaction of medication education received through MTB programs. The current study is novel because it primarily evaluates patients' satisfaction of the medication education received during the MTB. Other objectives of this study include evaluating the nursing perception of the MTB in facilitating transitions of care and determining the feasibility of MTB extension to other hospital units from pharmacy staff perspective.

Methods
This is a single-center, prospective survey study to assess patients' satisfaction with medication education received through the pilot MTB offered by a community pharmacy in a tertiary care hospital. The 8-week pilot study will include all patients 18 years and older, non-pregnant, who are admitted to the heart failure unit and opting in to receive their medications through the MTB. Eligible patients will be contacted via phone 2-7 days after their hospital discharge to complete a voluntary, anonymous survey to assess their satisfaction of the medication education quality they received as a part of the MTB. In addition, anonymous surveys from the unit nurses and pharmacy staff will be collected to assess the perception of the program's quality. Additional data such as delivery time and pharmacy interventions during the pilot MTB will be collected. Descriptive and qualitative analysis will be used to evaluate the survey responses received from patients, nurses, and the pharmacy staff, and service-related data.

Results
Data collection and study finding will be completed, pending IRB approval.

Conclusion
The study findings will help determine patient satisfaction with the MTB that offers medication education as a routine standard of service and formulate future feasibility of expanding the MTB.

Learning Objectives:

Discuss impact of medication bedside delivery programs on 30-day unplanned hospital readmission rates.
Identify areas of improvement in medication bedside delivery programs.

Self Assessment Questions:

What is the goal of the Hospital Readmissions Reduction Program (HRRP)?
A. To reduce planned hospital readmissions
B. To reduce hospital readmissions
C. To reduce avoidable hospital readmissions
D. None of the above

What are the components of a successful medication bedside delivery as proposed by previous studies?
A. Isolated bedside delivery services
B. Medication education
C. Transition of care follow-ups
D. Combination of the above choices

Q1 Answer: C Q2 Answer: D

SGLT2 Inhibitors effect on Heart Failure Readmission Rates

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Purpose: Patients who have been diagnosed with heart failure are generally on a cocktail of medications that can be difficult to manage. This can lead to non-adherence and high readmission rates. With ever-changing guidelines, an update in Heart Failure guidance recognizes that the known diabetes medications, empagliflozin and dapagliflozin [SGLT2, sodium-glucose cotransporter-2 inhibitors], have shown benefits in heart failure disease progression when used in combination with guideline directed medical therapy (GDMT). The common diabetes medication has also been shown to have benefit in heart failure alone and are now FDA approved for the common disease state. The purpose of this research study is to determine the impact of SGLT2 inhibitors on heart failure [both reserved and preserved] readmission rates.

Methods: This study is a retrospective single-center chart review conducted at Saint Joseph Health System in Mishawaka, IN. Patients were identified through the Saint Joseph Health System Epic report of discharged patients based on inclusion/exclusion criteria. Patients who were admitted to Saint Joseph Mishawka Medical Center with a heart failure exacerbation as a diagnosis were included. The primary outcome includes determining whether SGLT2 inhibitors have an impact on decreased readmission rates. Secondary outcomes observed include if SGLT2 inhibitors benefit mortality rate, adherence to treatment after initiation, reduction of heart failure symptoms, and change in serum creatinine levels. To assess adherence and symptoms, patients were surveyed after being on SGLT2 inhibitor therapy >1 month.

Results: Results and Conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Explain the impact of the novelty diabetes drug, SGLT2 inhibitors, on heart failure.
Identify barriers that patients with heart failure face.

Self Assessment Questions:

What SGLT2 inhibitors are currently approved for heart failure alone?

A. Jardiance and Farxiga
B. Invokana and Jardiance
C. Farxiga and Trulicity
D. Mounjaro and Invokana

What is a common side effect of SGLT2 inhibitors?

A. Hypoglycemia
B. Hypertension
C. Genitourinary Injections
D. Pancreatitis

Q1 Answer: A Q2 Answer: C

Incidence of worsening or new onset diabetic retinopathy in veterans with or without type 2 diabetes taking GLP-1 receptor agonists.

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Glucagon-like peptide 1 receptor agonists (GLP-1 RA) are commonly used in the management of type 2 diabetes mellitus (T2DM) and obesity with documented benefits in patients with cardiovascular disease (CVD) and chronic kidney disease (CKD). GLP-1 RAs have effects on both fasting and prandial blood glucose levels with a significant potential to lower A1C. Noted adverse effects of GLP-1 RAs include abdominal pain, headache, and a potential for new onset or worsening diabetic retinopathy (DR). The current literature surrounding the incidence of DR related to GLP-1 RAs conveys conflicting results. The SUSTAIN-6 trial noted a significant increased risk for DR complications in patients treated with semaglutide versus placebo. However, a more recent investigation conducted in the UK found no increased risk of DR with GLP-1 RAs when compared to other treatment modalities. Given the inconsistency in the literature, we would like to investigate the rate of worsening or new onset DR in patients on GLP-1 RAs within our facility.

Methods:
This is a retrospective cross-sectional study that will analyze the incidence of new onset or worsening DR in veterans taking a GLP-1 RA medication. Veterans who were prescribed a GLP-1 RA between May 1, 2021 and May 1, 2022 will be identified and followed through August 1, 2022. A diagnosis of progression of pre-existing DR or new onset DR will be counted as a positive case. A local computerized patient record system (CPRS) chart review will be utilized to collect patient data and assess for the primary outcome. Access to patient notes will be conducted by using local CPRS data and JLV (Joint Legacy Viewer) applications. Secondary outcomes include initiation of anti-VEGF therapy, discontinuation of therapy, and difference in measured A1C from prior to receiving a GLP-1 RA.
Results:
To be presented at the GLPRC.

Learning Objectives:

Describe The relationship between the use of glucagon-like peptide 1 receptor agonists and diabetic retinopathy worsening or incidence
Relate The results of this study to daily practice in order to better understand the associated risks of this medication class.

Self Assessment Questions:

At least one of the available glucagon-like peptide 1 receptor agonist medications have which of the following FDA indications for use?

A. To reduce the risk of major adverse cardiac events in adults with T2DM and established CVD
B. For obesity or overweight individuals in the presence of at least one weight-related comorbid condition in adjunct to lifestyle and diet changes
C. To improve glycemic control as an adjunct to diet and lifestyle in patients with T2DM
D. All of the above

Outside of the potential influence that GLP-1 agonist medications have on diabetic retinopathy, which of the following are known to influence the risk of retinopathy in diabetic patients?

A. Use of metformin
B. Use of empagliflozin
C. Poor glycemic control over a sustained period
D. Age

Q1 Answer: D Q2 Answer: C

Perceptions and Impact of Pharmacistsâ€™ Intervention in Pharmacogenetic Testing

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Purpose: Pharmacogenetic (PGx) testing has been successfully implemented in many clinical areas to improve patient outcomes but has not been implemented and evaluated in psychiatry. Currently, drug therapy in mental health disorders often has suboptimal results and many adverse effects. Psychotropic agents account for over one-third of the medications for which pharmacogenetic testing is available. Implementing pharmacogenetic testing in psychiatry could improve current practice through identifying the most likely effective medication, decreasing time spent switching between therapies and potentially avoiding adverse effects. Pharmacogenetic testing in attention-deficit/hyperactivity disorder (ADHD), depression, and anxiety is currently being implemented in an outpatient clinic, with pharmacistsâ€™ assistance in ordering pharmacogenetic tests, reviewing results with patients, and making medication recommendations as appropriate. This research aims to answer if pharmacistsâ€™ intervention in pharmacogenetic testing implementation improves patient outcomes and to assess the perceptions of clinic staff on pharmacistsâ€™ role in pharmacogenetic testing implementation.

Methods: Pharmacists began providing pharmacogenetic testing services in February 2022. Clinical outcomes were determined through retrospective review of patient charts for improvement in ADHD, depression, or anxiety symptoms. Clinic staff perceptions of pharmacistâ€™s intervention in pharmacogenetic testing was determined through a survey utilizing a 5-point Likert Scale administered to providers in January 2023.

Results/Conclusions: Data analysis is currently in progress and Results and Conclusions will be presented at the Great Lakes Pharmacy Residency Conference.
Learning Objectives:
Review literature regarding pharmacogenetic testing.
Recognize a pharmacistâ€™s role in the pharmacogenetic testing process.
Self Assessment Questions:
According to the literature, which of the following best describes pharmacogenetic testing?
A. Pharmacogenetic testing has not been successfully implemented in clinics
B. Improvement of patient outcomes in psychiatry has been proven through utilization of pharmacogenetic testing
C. Pharmacogenetic testing in psychiatry can help identify the most likely effective medication
D. Psychotropic agents account for three-fourths of medications with pharmacogenetic testing available
Which best describes pharmacistâ€™s role in pharmacogenetic testing?
A. Legislation in Indiana allows pharmacists to adjust psychotropic agents based on pharmacogenetic results
B. Pharmacists may follow up with patients and make medication recommendations
C. Pharmacists only play a role in pharmacogenetic testing for psychotropic medications
D. Pharmacogenetic testing eliminates the need for pharmacist intervention
Q1 Answer: C Q2 Answer: B

Evaluation of Factor Concentrates for Persistent Bleeding Post Cardiothoracic Surgery

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Purpose: Cardiothoracic surgery poses a risk of persistent bleeding due to impaired coagulation, platelet dysfunction, and increased fibrinolysis, and as a result, increases morbidity and mortality. Factor concentrates, such as four-factor prothrombin complex concentrate (4F-PCC), and recombinant factor VIIa (rFVIIa), are utilized to decrease transfusions, chest tube output, and re-exploration. At Loyola University Medical Center, a protocol for persistent bleeding in cardiothoracic surgery patients was updated based on available evidence to fixed dose 4F-PCC and a decreased weight-based dose of rFVIIa. The purpose of this study was to evaluate the efficacy and safety of the pre- versus post-change, as well as compare outcomes to available literature since there is no standard of care.

Methods: This was a retrospective, single-centered, cohort study of patients who received factor concentrates for persistent bleeding post cardiothoracic surgery. The primary outcome was chest tube output at 24 hours. The secondary outcomes include red blood cell transfusions, platelet transfusions, fresh frozen plasma transfusions, re-exploration, ICU/hospital length of stay, 30-day mortality, adherence to protocol, and cost. The primary safety outcome was the rate of thrombotic events (stroke, myocardial infarction, deep venous thromboembolism, and pulmonary embolism). The data was collected using REDCap and analyzed using SPSS software.

Results/conclusion: Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.
Learning Objectives:
Review the changes in institutional guidelines and available literature in patients post cardiothoracic surgery
Discuss the impact that the new protocol has on persistent bleeding in patients post cardiothoracic surgery
Self Assessment Questions:
1. Which is/are the reason(s) for persistent bleeding in cardiovascular surgery patients?

A. Platelet dysfunction
B. Impaired coagulation
C. Increased fibrinolysis
D. All of the above
What factors are in 4F-PCC?
A. II, VII, IX, X
B. II, VII, X, XI
C. I, II, VIIa, IX
D. II, VII, X, XII
Q1 Answer: D Q2 Answer: A

Comparison of Pharmacist versus Other Health Care Providerâ€™s Nirmatrelvir/Ritonavir Prescribing Habits in a Rural Health Care System

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Purpose: PaxlovidÂ© (nirmaltrelvir/ritonavir) is an investigational new drug that received an emergency use authorization (EUA) from the United States Food and Drug Administration in December of 2021 for outpatient treatment of mild to moderate SARS-CoV2 virus infections in adults and children 12 years and older. The EUA authorized physicians, advanced practice nurses, physician assistants, and pharmacists to prescribe the drug. Nirmaltrelvir/ritonavir has a significant number of contraindications due to multiple serious drug interactions. This retrospective study aims to evaluate if patients were appropriately prescribed nirmaltrelvir/ritonavir and to assess the number of potential office visits saved by pharmacists prescribing nirmaltrelvir/ritonavir.
Methods:
This study is a single center, retrospective, chart review, comparing the appropriateness of nirmaltrelvir/ritonavir prescriptions written by pharmacists versus other health care providers in a rural health care system. Providers in the health care system began prescribing nirmaltrelvir/ritonavir in April of 2022, and clinical pharmacists began reviewing online outpatient COVID-19 treatment request forms and prescribing as appropriate in June of 2022. Prescriptions written from June 13, 2022 to September 11, 2022 will be included in the analysis. Patientâ€™s profiles will be evaluated for contraindications including renal impairment, hepatic impairment, and potential drug interactions. Data collection forms will be utilized to collect patient demographic information, the provider type, moderate and severe drug interactions, attempted drug interaction management, and if the patient was appropriate for treatment with nirmaltrelvir/ritonavir. Statistical analysis will be used to determine the number of pharmacist- prescribed nirmaltrelvir/ritonavir prescriptions compared to other health care providers in the health system as well as the number of patients who received nirmaltrelvir/ritonavir when they had a contraindication to therapy.
Results/Conclusion: This study is still in progress. Results and conclusion will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:
Discuss appropriate prescribing of nirmaltrelvir/ritonavir for the outpatient treatment of COVID-19
Review nirmaltrelvir/ritonavir prescribing habits of pharmacists versus other providers in a rural health care system
Self Assessment Questions:
Which of the following is a contraindications to treatment with nirmaltrelvir/ritonavir?
A. Creatinine clearance less than 60 mL/min
B. Exposure to COVID-19 but no positive test confirming COVID-19 diagnosis
C. Patient with chronic obstructive pulmonary disease
D. Child-Pugh Class B hepatic impairment
Which of the following health care professionals cannot prescribe nirmaltrelvir/ritonavir?
A. Advanced Practice Nurses
B. Physician Assistants
C. Pharmacists
D. Dentists
Q1 Answer: B Q2 Answer: D

Evaluation of the Efficacy of a Vancomycin Dosing Nomogram for Obese Patients

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Background: Vancomycin is a glycopeptide antibiotic commonly used in the treatment of methicillin-resistant Staphylococcus aureus (MRSA) infections. Current practice includes utilizing population parameters to dose vancomycin, but this may not be appropriate for obese patients (defined as BMI â‰¥ 30 kg/m^2). A potential alternative to the dosing of vancomycin in these patients is the Crass Nomogram; however, existing research with this nomogram is limited. Due to the growing incidence of obesity in the United States, as well as the known risk of nephrotoxicity with vancomycin use, there is a need to standardize vancomycin dosing in this patient population. This study aims to compare the incidence of therapeutic area under the curve (AUC) in obese patients dosed using the Crass Nomogram versus traditional weight-based dosing regimens.

Methods: This retrospective cohort review includes obese adults who received vancomycin therapy and had at least two levels drawn within 96 hours of initiation. Patients were excluded if they had a creatinine clearance â‰¤ 30 mL/min; received intermittent vancomycin dosing or renal replacement therapy; diagnosis of cystic fibrosis, paraplegia/quadriplegia, or pregnancy; history of kidney transplant or limb amputation.

Outcomes: The primary endpoint for this study is the incidence of therapeutic AUC (defined as 400-600 mcg/mL*hr) based upon the first two vancomycin levels obtained at steady state. Secondary endpoints include the incidence of acute kidney injury, incidence of supratherapeutic AUC (> 600 mcg/mL*hr), and incidence of subtherapeutic AUC (< 400 mcg/mL*hr).

Results/Conclusions: Data and statistical analysis is in progress. Currently, 49 patients were dosed consistent with the Crass Nomogram, compared to 103 in the control group. Therapeutic AUC was attained in 53% of patients dosed per the Crass Nomogram, compared to 36% for the control group. Further results and conclusions will be presented as they become available.

Learning Objectives:

Identify patients that may benefit from vancomycin dosing consistent with the Crass Nomogram.

Select an appropriate vancomycin dosing regimen based on patient specific factors.

Self Assessment Questions:

Which of the following body mass indices (BMI) would indicate that a patient may benefit from vancomycin dosing consistent with the Crass

A. 35 kg/m^2

B. 29 kg/m^2

C. 26 kg/m^2

D. 18 kg/m^2

Which of the following pharmacokinetic parameters for vancomycin would you expect to be similar in obese patients compared to non-obese

A. Creatinine clearance (CrCl)

B. Elimination rate (k)

C. Bioavailability (F)

D. Volume of distribution (Vd)

Q1 Answer: A Q2 Answer: C

Evaluation of a Phenobarbital Loading Dose Series in the Newly Implemented Alcohol Withdrawal Treatment Plan: A retrospective analysis

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prolonged lengths of stay and admission to critical care units. Recently, data has supported the use of phenobarbital in patients at high risk for moderate to severe alcohol withdrawal. In August of 2022, Munson Medical Center (MMC) modified their current AWS treatment protocol to introduce phenobarbital earlier in the Clinical Institute Withdrawal Assessment (CIWA)-guided treatment pathway for patients who are at high risk for withdrawal. A phenobarbital loading dose series of 10 mg/kg or 6 mg/kg divided into three doses is implemented either at the first CIWA score â‰¥ 15 or on immediate initiation of the protocol for patients deemed high risk for withdrawal syndrome. The purpose of this study is to evaluate the newly implemented AWS treatment protocol.

Methods: This is a single-center retrospective chart review. Patients admitted to MMC between January 1st, 2020, and February 1st, 2023, with activation of the alcohol withdrawal treatment protocol and documented with at least one CIWA score of â‰¥ 15 or received at least one dose of phenobarbital will be used for data collection. The primary objective of this study is to determine if there is a difference in hospital length of stay between the new loading dose series and old protocol for alcohol withdrawal. Secondary outcomes assessed include the rate of ICU admission, ICU length of stay, total number of CIWA scores â‰¥ 15, cumulative dose of phenobarbital and lorazepam, intubation rates, and use of adjunctive medications.

Learning Objectives:

Describe how receptor modulation in the brain leads to the dependence and withdrawal symptoms associated with chronic alcohol exposure

Review the potential benefits of phenobarbital in the treatment of alcohol withdrawal syndrome

Self Assessment Questions:

Which receptors are affected by chronic alcohol exposure?

A. GABA and L-DOPA
B. GABA and NMDA
C. NMDA and 5-HT1A
D. Mu-opioid and L-DOPA
What situation would warrant caution in dosing phenobarbital due to the risk of respiratory depression?
A. Greater than or equal to 65 years old
B. Rib fractures
C. History of alcohol-withdrawal seizures
D. A and B
Q1 Answer: B Q2 Answer: D

Wait and HepC: Post-Transplant Antiviral Interaction Management

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Pan-genotypic direct-acting antivirals (DAAs) such as sofosvubir/velpatasvir and glecaprevir/pibrentasvir are indicated to treat hepatitis C virus (HCV) infections. HCV persists in organs from infected patients, often leading to chronic HCV, cirrhosis, and eventual death in transplant recipients. Efficacy of DAA regimens in nucleic acid test (NAT)-positive donors has been confirmed in prior studies. Further studies confirm that tacrolimus concentration-to-dose (C/D) ratio correlates with renal outcomes. The purpose of this project is to analyze changes in tacrolimus C/D ratio before and after DAA therapy in kidney and/or liver transplant recipients from HCV NAT-positive donors compared to a control group of recipients from donors who meet risk criteria for acute transmission of HCV but who are HCV NAT-negative.

This is a retrospective chart review of recipients of adult HCV NAT-positive kidney and/or liver transplant recipients compared to a matched control group of recipients from donors at risk of acute HCV transmission. Collected data included time from transplant to DAA initiation, as well as steady-state tacrolimus concentrations and doses immediately before DAA initiation, before completion of DAA therapy, and before SVR12 assessment. Anomalous levels were investigated to ensure accurate trough timing.

NAT-negative organ recipientsâ€“ as well as NAT-negative kidney recipientsâ€“ required progressively less tacrolimus over time to reach a given concentration (âˆ†C/D organs = 0.5898, $p < 0.0001$; âˆ†C/D kidneys = 0.7069, $p < 0.001$); this was not observed in liver recipients (âˆ†C/D livers = 0.0669, $p = 0.6848$), although a known interaction between tacrolimus and prophylactic fluconazole may confound these results. NAT-positive organ recipients did not follow this same pattern (âˆ†C/D organs = â€“0.5066, $p = 0.2641$). No significant differences in C/D ratio between NAT-positive and NAT-negative organ recipients were identified at any given time. Therefore, we recommend no empiric dose adjustments based on donor HCV NAT status or antiviral therapy.

Learning Objectives:
Explain the clinical significance of this study, and potential applications to pharmacy practice within the field of solid organ transplant.
Identify potential confounding factors that may influence tacrolimus troughs in recipients of HCV NAT-positive kidney and/or liver transplants.

Self Assessment Questions:
Which of the following statements represents an accurate clinical takeaway from this study?
A. Empiric tacrolimus dose adjustments should be initiated in patients initiating sofosbuvir/velpatasvir after transplant.
B. Empiric tacrolimus dose adjustments should be initiated in patients initiating glecaprevir/pibrentasvir after transplant.
C. Neither HCV NAT-positive nor -negative organ recipients show a significant change in tacrolimus dose requirements over time.
D. Over time, HCV NAT-negative organ recipients may require progressively less tacrolimus to reach a given concentration, while HCV NAT-positive organ recipients may not.
Which confounding factor is most likely to have influenced tacrolimus troughs during this study, and in what population was it observed?
A. Inaccurate trough timing in HCV NAT-negative organ recipients
B. Inaccurate trough timing in HCV NAT-positive organ recipients
C. Drug interactions in liver recipients
D. Drug interactions in kidney recipients
Q1 Answer: D Q2 Answer: C

Evaluation of the Weaning of Alpha-2 Agonists When used for Sedation in the Neonatal Intensive Care Unit (NICU)

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ventilation, reduced duration of hospitalization, and improved neurodevelopmental outcomes in comparison to opioids and benzodiazepines. Weaning a prolonged course of dexmedetomidine increases the risk for withdrawal symptoms such as rebound hypertension and tachycardia, which clonidine is frequently used to manage. Currently, there is a paucity of data describing the ideal process for weaning alpha-2 agonist medications. The purpose of this study was to describe the approach of weaning off alpha-2 agonists used for sedation in a level IV NICU. This retrospective chart review included infants admitted to the NICU who received dexmedetomidine for greater than 5 days for sedation from January 1, 2018 to January 1, 2022. Infants who received alpha-2 agonists for neonatal abstinence syndrome or autonomic storming where excluded. The primary outcome was the difference in dexmedetomidine duration in patients who were weaned off dexmedetomidine without the addition of enteral clonidine compared to those who were weaned with the addition of enteral clonidine. Secondary outcomes evaluated patient-specific factors that were correlated with prolonged exposure to alpha-2 agonists. Preliminary results demonstrate that of the 102 patients that were included, 32% (n=33) patients required clonidine as an adjunct. The mean gestational age and birth weight were 33.7 weeks (SD 5.07) and 2.27 kilograms (SD 1.04), respectively. The mean duration of dexmedetomidine among all patients was 41.19 days (SD 40.63). The most common initial dose of clonidine was 3 mcg/kg/dose (27% of patients), followed by 2 mcg/kg/dose (24%). Final conclusions and significance of the primary and secondary outcomes will be determined upon completion of statistical analysis.

Learning Objectives:

Discuss the benefits of utilizing alpha-2 agonists for sedation in neonates

Identify potential adverse effects of alpha-2 agonist therapy

Self Assessment Questions:

Which of the following is true regarding the utilization of alpha-2 agonists in the neonatal population?

A. Safe and effective dosing of clonidine has been well established in the neonatal literature for the purpose of weaning dexmedetomidine

B. Dexmedetomidine is associated with increased length of hospital stay and duration of mechanical ventilation when compared to opioids and benzodiazepines

C. Benzodiazepines and opioids have been shown to be associated with poor neurodevelopmental outcomes compared to dexmedetomidine

D. There is no risk for withdrawal in patients on prolonged dexmedetomidine therapy

What combination of adverse effects may be observed in patients on alpha-2 agonist therapy?

A. Hypertension, tachycardia

B. Hypotension, bradycardia

C. Agitation, tachypnea

D. Respiratory depression, constipation

Q1 Answer: C Q2 Answer: B

Guideline Adherence to Hepatitis B Virus (HBV) Screening and Vaccination in Patients Prescribed Human Immunodeficiency Virus (HIV) Pre-exposure prophylaxis (PrEP)

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Human immunodeficiency virus (HIV) pre-exposure prophylaxis (PrEP) with daily oral emtricitabine/tenofovir disoproxil fumarate (FTC/TDF) or emtricitabine/tenofovir alafenamide (FTC/TAF) has been found to be safe and effective in substantially reducing HIV acquisition in high-risk persons. The US Public Health Service PrEP guideline offers recommendations for the screening and vaccination for Hepatitis B Virus (HBV) in patients prescribed oral PrEP. The purpose of offering HBV screening and vaccination to patients using PrEP is twofold. One is to reduce HBV transmission, as risk factors for HBV and HIV are similar. The second is to ensure appropriate treatment and monitoring for patients with HBV infection, as FTC/TDF and FTC/TAF are approved treatments for HBV, and abrupt discontinuation could lead to an acute flare of HBV. The goal of this study is to compare guideline adherence to the rate of HBV screening and vaccination.

This study is a retrospective comparative study evaluating the rate of HBV screening and vaccination in patients â‰¥ 18 years old who received a prescription for oral PrEP at the University of Illinois Hospital and Health Sciences System (UI Health) during two time periods, 07/01/2014 - 09/30/2018 and 10/01/2018 - 10/01/2022. Patients currently receiving HBV treatment or with a positive HIV immunoassay blood test at baseline screening will be excluded. All data will be collected from the electronic medical record and entered in REDCap. The primary outcome is comparing appropriate screening and vaccination for HBV according to the US Public Health Service PrEP guideline. The secondary outcomes include documentation of immunity and/or vaccination to hepatitis A virus, human papilloma virus, and meningitis.

Data collection and analysis is ongoing. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Review PrEP therapy and the US Public Health Service PrEP guideline recommendations

Recognize the purpose of HBV screening and vaccination in patients prescribed HIV oral PrEP

Self Assessment Questions:

1.Guideline recommendations for baseline testing before starting HIV PrEP include(s):

A. Electrolytes

B. Hemoglobin A1c

C. Hepatitis B serology tests
D. Liver function tests
Which of the following is a reason to screen HBV serologies before initiating HIV PrEP therapy?
A. To ensure patient does not have HIV
B. To help reduce HBV transmission
C. To prevent renal dysfunction
D. To prevent transmission of HIV
Q1 Answer: C Q2 Answer: B

CRE-LITE Treatment and Associated Clinical Outcomes

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complexity and rarity of CRE-LITE infections, treatment regimens among patients are not standardized. This project aims to describe treatment and clinical outcomes of CRE-LITE infections at a single academic medical center.

â€˜CRE-LITEâ€™ refers to Enterobacteriaceae isolates resistant to at least one carbapenem, while still maintaining susceptibility to one carbapenem or carbapenem/beta-lactamase agent. All patients that were admitted and had a culture positive for CRE-LITE at UW Health from January 1, 2009 to December 31, 2018 were included. Patients with non-Enterobacteriaceae cultures, urine isolates, or who were colonized with CRE-LITE and did not receive treatment, were excluded. Data was collected and reviewed retrospectively and included risk factors for CRE-LITE, empiric and definitive antimicrobial treatments, and outcomes. The primary outcome of clinical success was assessed at 30 days. Secondary outcomes include infection recurrence, hospital readmission, and mortality, all assessed at 90 days. Primary and secondary outcomes were compared between two treatment groups, beta-lactam/beta-lactamase inhibitors (BL/BLIs) versus non-beta-lactamase/beta-lactamase inhibitors (NBL/BLIs).

After the patient screening process, 27 cases of CRE-LITE (27/14,940, 0.18%) were identified at UW Health from 2008-2019. Fourteen patients (14/27, 51.9%) received empiric antibiotic therapy that was active against CRE-LITE. Most patients (19/27, 70.4%) received NBL/BLI for definitive CRE-LITE treatment. Two patients were lost to follow up in each comparison arm at 30 days and were excluded from further analyses. At 30 days, there was no difference in clinical success between patients who received BL/BLI and NBL/BLIs (17 vs 8, p=0.36). Secondary outcomes at 90 days, including mortality, hospital readmission, and infection recurrence were not statistically significant between treatment groups.

Preliminary results show no difference in outcomes in the treatment of CRE-LITE infections with BL/BLIs versus NBL/BLIs. Further investigation is needed.

Learning Objectives:
Recognize the prevalence and increasing threat of Carbapenem Resistant Enterobacteriaceae (CRE) infections
Identify risk factors for multi-drug resistant organisms (MDROs)

Self Assessment Questions:
Which of the following is true regarding Carbapenem Resistant Enterobacteriaceae (CRE) infections?
A. Carbapenem resistance in Enterobacteriaceae can be caused by multiple mechanisms
B. CRE infections have a low rate of morbidity and mortality
C. Treatment of CRE infections among patients is standardized
D. CRE is not listed as a threat on the CDCâ€™s 2019 AR Threats Report
Which of the following is a risk factor for a multi-drug resistant organism (MDROs), such as CRE?
A. Recent antibiotic exposure
B. Recent hospital admission
C. History of an MDRO infection
D. All of the above
Q1 Answer: A Q2 Answer: D

Efficacy and Safety of Unfractionated Heparin Versus Low Molecular Weight Heparin in the Treatment of Acute Venous Thromboembolism

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Title: Impact of initial anticoagulation with low molecular weight heparin versus unfractionated heparin on anticoagulation failure in acute venous thromboembolism

Purpose: There are currently many different ways to treat acute venous thromboembolism (VTE) in the inpatient setting. Additionally, there have not been many studies directly comparing failure rates of anticoagulants for this purpose. The goal of this study is to evaluate the efficacy of the treatment modality used during the initial treatment phase and compare the amount of patients requiring alternate therapy or who decompensate on their initial anticoagulant.

Methods: This study was submitted to the Institutional Review Board for approval. This retrospective, observational chart review will include all eligible patients admitted to Ascension Genesys Hospital between January 1, 2016 to September 1,2022. The primary objective is to evaluate the impact of initial anticoagulation with low molecular weight heparin (LMWH) versus unfractionated heparin (UFH) on clinical decompensation and major bleeding events in patients treatment for acute VTE. Eligible patients include those who are 18 years or older with a confirmed diagnosis of VTE who receive initial anticoagulation with LMWH or UFH. Collected data will include baseline characteristics such as age, weight, and sex as well as information specific to our outcomes including anticoagulation regimen, incidence of major bleeding, incidence of death, and incidence of escalation of care. To assess the outcome data, nominal data will be assessed using the chi-square test while continuous secondary outcomes will be assessed for statistical significance using a t-test. Descriptive statistics will be reported with frequencies and means.

Results: Anticipated to be completed by the 2023 Great Lakes Pharmacy Resident Conference

Conclusions: Conclusions from the study will be formulated

Learning Objectives:
Identify the need for studies to be conducted in the acute phase of venous thromboembolisms
Recognize the treatment options for acute venous thromboembolisms
Self Assessment Questions:
Which of these is correct regarding the available literature surrounding acute treatment of venous thromboembolisms?
A. The current literature supports the use of warfarin as the drug of choice
B. Many of the current guidelines provide a multitude of options for treatment of venous thromboembolisms in the acute phase
C. There is a lack of literature comparing the treatment options for acute venous thromboembolisms
D. Current literature states that low molecular weight heparin is superior compared to unfractionated heparin
Which group of medications are all indicated in the acute phase of venous thromboembolism?
A. Low molecular weight heparin, unfractionated heparin, apixaban, warfarin
B. Warfarin, unfractionated heparin, bivalirudin, fondaparinux
C. Unfractionated heparin, low molecular weight heparin, apixaban, xarelto
D. Aspirin, Atorvastatin, Metoprolol succinate, apixaban
Q1 Answer: C Q2 Answer: C

Implementation and Evaluation of Ambulatory Care Pharmacist Administered Depression Screenings in Patients with Diabetes in Primary Care Clinics

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Purpose: Major depressive disorder is one of the most prevalent mental disorders in the United States. In 2020, the National Institute of Mental Health estimated that 21 million adults in the United States experienced at least one major depressive episode. This represents 8.4% of the entire U.S. population. Depression is an independent risk factor for nonadherence to diabetes medications. The purpose of this study is to assess the use of pharmacist driven depression screenings within primary care clinics. The screenings will be used to assess depression in the diabetic population in which there is a pharmacist embedded in diabetes care.
Methods: This quality improvement project implemented a new workflow for ambulatory care pharmacists to execute pharmacist administered PHQ-2 depression screenings and subsequent PHQ-9 depression screenings if a PHQ-2 score was â‰¥3. Retrospective chart review from September 12, 2022 through January 1, 2023 was conducted to evaluate the implementation of depression screenings in adult diabetic patients seen by ambulatory care pharmacists in primary care clinics.
The primary objective of this study was to identify patients with diabetes that needed screened for depression and assess how many PHQ-2 screenings pharmacists performed during the study period. The secondary objectives were to evaluate the percentage of diabetes patients positive on a PHQ-9 depression screen, negative on a PHQ-2 depression screen, number of notifications sent to providers, and antidepressant medications started due to positive PHQ-9 scores.
Patients with a diabetes diagnosis seeing a pharmacist during the study period were included in the study. Exclusion criteria consisted of any patients previously diagnosed with depression, those on an antidepressant medication during the study period, patients that had received a PHQ-9 assessment in the previous year, and telehealth pharmacy visits.
Quantitative assessment of the notifications to providers and subsequent outcomes were gathered for sub-analysis.
Learning Objectives:
Identify the importance of screening patients with chronic comorbidities for depression.
Discuss current literature findings regarding depression screening in the diabetes population.
Self Assessment Questions:
What is the importance of screening patients with chronic comorbidities for depression?
A. To assess current antidepressant medication efficacy.
B. To assess if depression has worsened.
C. To identify patients that need monitored for other psychological conditions.
D. To identify patients that may benefit from antidepressant therapy.
What percentage of the U.S. population experienced a depressive episode in 2020?
A. 0.062
B. 0.084
C. 0.105
D. 0.157
Q1 Answer: D Q2 Answer: B

Analyzing Appropriate Sedation Regimens for Mechanically Ventilated Patients Based on Their COVID - 19 Status
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would lead to successful weaning from the ventilator. Mechanical ventilation is a traumatizing and anxiety-ridden intervention that may become necessary for patients who are having difficulty breathing or are unable to protect their airway. Due to the psychological implications mechanically ventilating a patient has on their psyche, these patients often require analgesia and sedation in order to maintain a state of light sedation to allow for resolution of their underlying condition.
This research project was conducted as a retrospective, case controlled, single-center, chart review study. The study included patients 18 years and older, who were admitted to Continuing Care Hospital (CCH) between January 2021 and November 2022. These patients must have been mechanically ventilated, have undergone at least two spontaneous breathing trials (SBTs), and given medications for either sedation or agitation during the ventilation and weaning process. Patients were separated into two distinct groups based on COVID - 19 status. Specific sedation/agitation medications of interest were oxazepam, quetiapine, dexmedetomidine, propofol, and midazolam. Other pertinent data collected included co-morbidities, sex, age, number of days on the ventilator at CCH, and number of spontaneous breathing trials performed at CCH. The primary goal was to determine patient centered sedation regimens that increased the likelihood for successful weaning from the ventilator tailored to COVID - 19 status. Secondary outcomes addressed other co-morbidities that may increase difficulty in ventilator weaning such as chronic respiratory and psychiatric disorders.
Final results and conclusions are in progress and will be presented at the 2023 Great Lakes Pharmacy Resident Conference.
Learning Objectives:
Review the PADIS guidelines as they relate to prolonged mechanical ventilation
Identify patient specific risk factors that increase likelihood of failing a spontaneous breathing trial
Self Assessment Questions:
Based on the PADIS guidelines, which of the following statements is true?
A. Patients should be sedated to a Richmond Agitation Sedation Score (RAAS) of - 4 while mechanically ventilated to prevent ICU delirium
B. Dexmedetomidine is contraindicated in patients who are mechanically ventilated due to increased ICU length of stay

C. Propofol is preferred for sedation/agitation over midazolam in mechanically ventilated patients
D. Patientâ€™s rooms should remain lit and loud music should be played at all hours in order to keep patient alert while mechanical ventilated
who presents to your long-term acute care hospital from an outside hospital for ventilator weaning. SM has been on the ventilator for 35 days and has been unsuccessful in weaning at the outside hospital. What risk factors does SM have that may increase his risk for failing a spontaneous breathing trial?
A. Hyperlipidemia
B. Older than 40 years
C. Male
D. Asthma
Q1 Answer: C Q2 Answer: D

Emergency medicine provider experiences with a pharmacist-driven opioid use disorder medication-assisted treatment consultation service: a qualitative study

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The opioid epidemic has necessitated the search for safe, effective, and feasible means to treat opioid use disorder (OUD). Medication-assisted recovery (MAR) utilizes pharmacotherapy, often along with psychosocial interventions, and is first-line treatment for OUD. The emergency department (ED) is a critical care site, as itâ€™s often the first or only contact point for patients with OUD. The University of Illinois Chicago (UIC) hospital recently implemented a novel pharmacist-driven OUD MAR consultation service with the ability to care for patients in the ED regardless of disposition. The objective of this study is to evaluate provider acceptance of and satisfaction with a pharmacist-driven OUD MAR consult service in the ED.
This is a single-center descriptive survey study. The survey will be distributed electronically to UIC ED providers, including physicians (medical doctors and doctors of osteopathic medicine) and nurse practitioners. Participants will receive an email outlining the study along with a link to the Qualtrics survey. The primary outcome of the study is provider acceptance of and satisfaction with the consult service. Secondary outcomes include characterization of providersâ€™ viewed appropriateness of the service, barriers to its use, facilitators to its use, and perceived positive and negative outcomes. Analysis will include descriptive statistics. Results are pending data collection and analysis.

Learning Objectives:
Recognize potential barriers to care that patients with opioid use disorder face in the emergency department.
Describe the pharmacist-driven opioid use disorder medication assisted recovery consult service at University of Illinois Chicago
Self Assessment Questions:
What are potential barriers to care that patients with opioid use disorder face in the emergency department?
A. Stigmatization of disease state and treatment
B. Regulatory barriers
C. Logistic barriers (including time and cost)
D. All of the above
Which of the following is true regarding the opioid use disorder medication assisted recovery consult service at University of Illinois Chicago?
A. Pharmacists serve an ancillary role and assist with select patients as needed.
B. The consult service is available in the emergency department, but only for patients being admitted to the hospital.
C. The consult service not only provides recommendations for acute medication therapy, but also assists with discharge planning and transitions-of-care for outpatient opioid use disorder treatment.
D. The order to consult the service in the electronic health record system is separate from relevant order sets.
Q1 Answer: D Q2 Answer: C

Impact of Outpatient COVID-19 Therapies on Hospital Admission at a Community Hospital

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Purpose: To date, the Centers for Disease Control and Prevention (CDC) has reported over 100 million confirmed COVID-19 cases in the United States. Over the course of the pandemic, several outpatient therapies have been developed that show decreased hospitalizations. These treatments include monoclonal antibodies such as bamlanivimab, casirivimab/imdevimab, bamlanivimab/etesevimab, sotrovimab, and bebtelovimab, and oral antivirals such as nirmatrelvir/ritonavir. The purpose of this study was to evaluate the impact of outpatient COVID-19 therapies on hospital admission at the study institution.

Methods: A retrospective chart review of patients who tested positive for COVID-19 from March 1, 2022 to October 1, 2022 was conducted. Patients were excluded if they were less than 18 years of age, less than 40 kilograms, or were initiated on COVID-19 therapy during admission. Patients were categorized into those who received outpatient therapy and those who did not and were randomly reviewed until 100 patients in each group met inclusion criteria. Demographic information, including age, gender, weight, body mass index (BMI), race, pregnancy status, COVID-19 vaccination status, and co-morbid conditions was collected. Other data points included hospital admission within 14 days of positive COVID-19 test, intensive care unit (ICU) transfer, hospital and/or ICU length of stay, mechanical ventilation requirements, emergency department visit(s) within 14 days from positive COVID-19 test, in-hospital COVID-19 mortality, and infusion-related reaction(s) from COVID-19 therapy. Nominal data was analyzed with chi-square tests and continuous data was analyzed with t-tests.

Results/Conclusion: Data collection and analysis are ongoing. Results and conclusions will be presented at the 2023 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Review outpatient treatment options for COVID-19

Describe the potential impact of outpatient COVID-19 therapies on clinical outcomes

Self Assessment Questions:

Which of the following is an oral treatment option for COVID-19 that has been associated with decreased hospitalization rates among adults?

A. Nirmatrelvir/Ritonavir
B. Remdesevir
C. Bamlanivimab/Etesevimab
D. Bebtelovimab

Which of the following is not a potential benefit of outpatient COVID-19 therapies?

A. Reduced COVID-19 related hospitalizations
B. Decreased all-cause mortality
C. Increased COVID-19 symptoms
D. Decreased viral load

Q1 Answer: A Q2 Answer: C

Improving Medication Reconciliation Technician Training and Education Through Performance Audits, Training Updates, and Educational Review

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or inappropriate administrations. The average hospitalized patient is subject to at least one medication error per day. It is believed that more than 40% of medication errors result from inadequate medication reconciliation upon admission, transfer, and discharge of patients. The purpose of this research is to determine if development of a standardized medication reconciliation training process will improve the accuracy of medication history interviews and documentation.

Methods: This study was conducted in 3 phases: the pre-education phase, the education phase, and the post-education phase. The pre-education phase included the development of an audit checklist. This was utilized to analyze the documentation of 10 medication histories per medication reconciliation technician at a 200-bed hospital in Lafayette, Indiana. The education phase included the development/revision of medication history training documents. A training session was then executed with the technicians. The post-education phase consisted of a post-audit where 10 medication histories per technician were reviewed and compared with the pre-audit results. Development of an auditing system and a yearly refresher course was made and given to all medication reconciliation technicians.

Results: The percentage of applicable tasks completed accurately for each technician based on the pre-audits were 87.3%, 64.4%, 83.2%, and 70.6%. Each technician had their results reviewed with them. Additionally, each technician was re-trained on medication history documentation. All technicians were provided with copies of the updated materials, including: a medication interview flowsheet, a medication history documentation flowsheet, a medication reconciliation pocketbook, and a medication reconciliation technician training PowerPoint.

Conclusion: The pre-education phase demonstrated the need for a standardized medication reconciliation training process to have consistent documentation on medication histories. Post-education phase results/conclusion will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:
Describe the importance of accurate medication reconciliation documentation.
Recognize the importance of appropriate medication interview technique to provide the best possible medication list.
Self Assessment Questions:
Select the most appropriate answer. Which medication error(s) can be prevented with accurate medication reconciliation documentation?
A. Duplications
B. Omissions
C. Drug interactions
D. All of the above
Which of the following questions is LEAST appropriate to ask during a medication history interview?
A. What prescription medications do you take?
B. What creams, ointments, or eye drops do you use?
C. Do you take baby aspirin every day?
D. What non-prescription medications do you take?
Q1 Answer: D Q2 Answer: C

Effect of Education to Medical Staff on Prescribing Patterns of Antibiotic Therapy in Aspiration Pneumonia
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pertinent clinical information for patients to be included in the study.

Methods: The primary investigator will provide education on aspiration pneumonia to medical staff in October of 2022. Then using a clinical surveillance tool, the primary investigator will retrospectively identify adult patients who were admitted to MHSB from July 1, 2022 and January 1, 2023 who received antibiotics with an assigned indication of aspiration pneumonia or pneumonia. The primary investigator will eliminate any individuals who do not meet the criteria for inclusion in the study. Approximately 100 patients who received treatment before the educations will be analyzed to compare approximately 100 patients who received treatment after the study intervention. Patient baseline characteristics that will be collected include age, gender, race, pre-existing co-morbid conditions, diagnosis of aspiration pneumonia, dental health status, aspiration-associated risk factors, abnormal chest radiography, white blood cell count, maximum temperature measured, average blood pressure, start date and time of antibiotic therapy, and antibiotic name and route started at the time of initial treatment. Additional data that will be collected will include predetermined primary and secondary endpoints. Data will be collected using data collection software or manually through chart review. Data will be stored and analyzed using Microsoft ExcelÂ®.

Results: In the pre-implementation group, 100 patients were found to meet criteria. In the post-implementation group, 100 patients were found to meet criteria. Further data collection and analysis is ongoing. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:
Explain what aspiration pneumonia is and the risk factors associated with it.
Identify a treatment course for a patient being treated for aspiration pneumonia.
Self Assessment Questions:
Which of the following is a risk factor for aspiration pneumonia?
A. Diabetes mellitus
B. Hyperlipidemia
C. Gastroesophageal reflux disease
D. Heart failure
experiencing shortness of breath, cough, and fever. There is a concern for aspiration pneumonia. There current labs include a WBC of 15000 cells/mm3, a respiratory rate of 25 breaths/minute, and a temperature of 101.2 degrees F. Other labs and vital signs are within normal range. Patient has normal dental health and no history of recent hospitalization or use of antibiotics. Based on the information above, what management would be most appropriate?
A. Do not start antibiotics
B. Initiate metronidazole for aspiration pneumonia
C. Initiate piperacillin/tazobactam for high-risk aspiration pneumonia
D. Initiate ampicillin/sulbactam for low-risk aspiration pneumonia
Q1 Answer: C Q2 Answer: D

Ertapenem vs Meropenem for the treatment of ESBL-producing Enterobacterales bacteremia in critically ill patients

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Purpose:
Carbapenems are considered first-line treatment for bacteremia due to ESBL-producing organisms. Ertapenem concentrations are lower in critically ill patients due to altered pharmacokinetics, whereas meropenem concentrations appear to be unaffected. Limited data exist demonstrating any effect on outcomes from lower ertapenem concentrations. This study evaluated the difference in clinical efficacy between ertapenem and meropenem for the treatment of ESBL-producing Enterobacterales bacteremia in critically ill patients.

Methods:
A retrospective chart review was completed of patients admitted to Beaumont Health between October 1st, 2016, and July 31st, 2022. The primary outcome was a composite of clinical failure including all-cause mortality at 30 days, antibiotic escalation, and microbiological failure. Secondary outcomes were intensive care unit (ICU) length-of-stay, hospital length-of-stay, readmission rate, and development of superinfection. Inclusion criteria was age 18 years or older, at least one positive blood culture with an ESBL-producing Enterobacterales, and receipt of ertapenem or meropenem during an ICU admission. Exclusion criteria was treatment with less than 24 hours of a carbapenem, expiration within 24 hours of ICU admission, or polymicrobial bacteremia. Patients with multiple admissions had only their first eligible admission included. The following were collected: baseline demographics, past medical history, patient severity described by Sequential Organ Failure Assessment (SOFA) score, laboratory data, microbiological data, infection source, and treatment-related parameters including carbapenem dose and duration. Primary and secondary outcomes will be analyzed using either logistic regression or non-parametric methods.

Results and Conclusion:
A total of 300 patients were screened for inclusion. Of those, 16 were eligible who received ertapenem and 140 who received meropenem. To include about 2:1 ratio of meropenem to ertapenem patients, 38 were randomly selected for analysis from the meropenem group and all 16 will be analyzed in the ertapenem group. Full results and conclusion will be presented at Great Lakes Pharmacy Residency Conference 2023.
Learning Objectives:
Describe differences in the spectrum of activity and pharmacokinetics of meropenem and ertapenem
Identify factors of critically ill patients that result in altered pharmacokinetics
Self Assessment Questions:
Which is of the following is true regarding ertapenem?
A. It provides coverage against Pseudomonas aeruginosa
B. It is not highly bound to albumin
C. It is highly bound to albumin and is cleared faster in states of hypoalbuminemia
D. It is dosed as frequently as meropenem
Critically ill patients may display which of the following:
A. Higher volume of distribution
B. Low albumin
C. Augmented renal clearance
D. All of the above
Q1 Answer: C Q2 Answer: D

Itâ€™s TRiCH-y: Impact of Social Determinants of Health on Preferred Treatment of Trichomonas vaginalis and Chlamydia trachomatis

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Centers for Disease Control and Prevention STI Treatment Guideline modified recommendations for chlamydia and trichomonas therapy from a single dose to a seven-day course, which has important implications for patient adherence. Social determinants of Health (SDOH) are defined as the conditions where people live, work, and carry out their lives. Although the relationship between STI risk and SDOH is well documented, little is known regarding the association between SDOH and STI treatment. The purpose of this study is to evaluate the treatment of Trichomonas vaginalis and Chlamydia trachomatis infections after the 2021 CDC STI Guideline update, and to determine if health inequities exist with the use of preferred therapy.

This is a retrospective cohort study of patients diagnosed with T. vaginalis or C. trachomatis from 1/1/2022-7/31/2022 in outpatient clinics and emergency departments (ED) throughout Henry Ford Health. Patients were included if they were â‰¥15 years of age with a microbiologically confirmed diagnosis of T. vaginalis or C. trachomatis. Patients were excluded if they were pregnant/nursing mothers, incarcerated persons, documented allergies to preferred antibiotics, diagnosed with complicated infections requiring prolonged treatment duration, or were unable to take by-mouth medications. The primary outcome is the proportion of patients who receive guideline preferred versus discordant antibiotic therapy for T. vaginalis and C. trachomatis. The primary aim of the study is to assess relationships between SDOH and use of preferred versus alternative, discordant or no therapy for trichomonas or chlamydia. Assuming a two-sided Î± of 0.05, beta (1-Î²) of 0.8, and to detect a 10% difference in frequency of outcome between any two levels of exposure variables, a total sample of 712 patients is needed.

Results and Conclusion will be presented at GLPRC.

Learning Objectives:

Define social determinants of health.

Select the preferred therapy for male and female patients with trichomonas and chlamydia infections consistent with the 2021 CDC STI guidelines.

Self Assessment Questions:

Which of the following are considered social determinants of health?

A. Conditions in the environments where people are born, work, live, and age

B. Nonmedical factors that influence health outcomes

C. The wider set of forces and systems shaping the conditions of daily life

D. All of the above

Select the preferred therapy for a 21-year-old female with no known allergies who has a positive urine Trichomonas vaginalis result.

A. Metronidazole 2 grams PO as a single dose

B. Metronidazole 500 mg PO BID for 7 days

C. Azithromycin 1 gram PO as a single dose

D. Doxycycline 100 mg PO BID for 7 days

Q1 Answer: D Q2 Answer: B

Proning in Acute Respiratory Distress Syndrome: To Paralyze, or Not to Paralyze, that is the Question

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include low-tidal volume ventilation, prone positioning, and conservative fluid management. The landmark study that demonstrated a mortality reduction with prone positioning utilized neuromuscular blocker (NMB) infusions in greater than 90% of patients. Previous trials assessing prone positioning with neutral findings described low usage of NMB infusions. NMB infusions when used without prone positioning have not been shown to improve outcomes. The purpose of this study is to evaluate clinical outcomes in patients with moderate to severe ARDS that underwent prone positioning while receiving mechanical ventilation that received a NMB infusion compared to those who did not.

Methods: This was an IRB approved, retrospective, cohort study that included mechanically ventilated adult patients with COVID-19 diagnosed with moderate to severe ARDS (PaO2:FiO2 < 150) admitted to the intensive care unit (ICU) at a large, academic medical center. All patients received prone positioning for at least 12 consecutive hours on at least 1 day of mechanical ventilation. The intervention group included patients that received a NMB infusion for at least 12 hours while receiving prone positioning. The control group included those that did not receive a NMB infusion for at least 12 hours while undergoing prone positioning. The primary outcome was the difference in the alive and ventilator free score at 28 days between the intervention and control groups. Secondary outcomes included adverse events, sedation requirements, length of ICU stay, and disposition. Statistical tests used included chi-squared tests for nominal data, Mann-Whitney U for ordinal data, and parametric T-test for continuous/interval data.

Results and Conclusion: To be presented at Great Lakes Pharmacy Resident Conference

Learning Objectives:

Select an evidence-based treatment strategy for a patient with moderate to severe acute respiratory distress syndrome

Describe the clinical benefits of prone positioning in patients with acute respiratory distress syndrome

Self Assessment Questions:

Which of the following best describes benefits that have been shown when using prone positioning in mechanically ventilated patients with moderate to severe acute respiratory distress syndrome?
A. Reduced mortality
B. Reduced ventilator-free days
C. Reduced sedation requirements
D. Reduced 30-day hospital re-admissions
Which of the following is most likely to improve outcomes in a hemodynamically stable patient receiving mechanical ventilation with acute respiratory distress syndrome and a PaO2:FiO2 ratio of 112?
A. Conservative fluid management
B. Aggressive fluid resuscitation
C. Inhaled pulmonary vasodilator
D. Scheduled albuterol-ipratropium nebulizer treatments
Q1 Answer: A Q2 Answer: A

Comparing significant toxicities of BTK inhibitors after venetoclax to venetoclax after BTK inhibitors in patients with relapsed/refractory chronic lymphocytic leukemia

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Brutonâ€™s Tyrosine Kinase inhibitors (BTKi) and venetoclax are therapy options for the first-line and second-line treatment of chronic lymphocytic leukemia (CLL) and small lymphocytic lymphoma (SLL) and are preferred agents according to the National Comprehensive Cancer Network Guidelines. The efficacy of the sequence between a BTK inhibitor after venetoclax and venetoclax after a BTKi has been established by existing literature. However, safety data analyzing the sequence between a BTKi and venetoclax is lacking. Therefore, there is limited guidance for appropriate sequence selection between a BTKi and venetoclax regarding patient safety and toxicity.

This single-center, retrospective cohort study will evaluate and compare therapy-related toxicities in patients who received a BTKi after venetoclax versus venetoclax after a BTKi for the treatment of relapsed, refractory CLL or SLL. Clinical data will be collected for patients who received treatment for CLL or SLL with a BTKi and venetoclax between December 31, 2009 and October 20, 2022. Patients aged 18 years and older with a diagnosis of CLL or SLL and treatment with both a BTKi (acalabrutinib, ibrutinib, or zanubrutinib) and venetoclax will be included in this analysis. The primary objective of this study is to compare the difference in composite grade 3 or higher toxicities in patients receiving a BTKi after venetoclax versus venetoclax after a BTKi for the treatment of relapsed, refractory CLL or SLL. The secondary objectives are to compare the incidence of dose reduction and treatment discontinuation, objective response rates, time to next treatment with subsequent line of therapy, median rates of grade 3 or higher toxicities, prognostic predictors of progression, and rates of toxicity for BTKi and venetoclax in the first-line setting.

The results and conclusions of this study will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:
Review guideline-based and evidence-based recommendations for the treatment of relapsed/refractory CLL.
Describe grade 3 or higher toxicities associated with the use of BTK inhibitors or venetoclax in the setting of relapsed/refractory CLL.
Self Assessment Questions:
Which of the following is not a NCCN guideline preferred agent for the second-line treatment of CLL?
A. Venetoclax
B. Ibrutinib
C. Idelalisib
D. Acalabrutinib
Which of the following is a significant toxicity of ibrutinib?
A. Atrial fibrillation
B. Increased risk of bleeding
C. Hypertension
D. All of the above
Q1 Answer: C Q2 Answer: D

Prescribing Antibiotics Using Order Sentences in Ambulatory Care Settings

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Commission have amplified antimicrobial stewardship efforts in ambulatory healthcare settings. An antibiotic order sentence (AOS) is a tool used in outpatient clinics that can help guide prescribers to select the optimal antibiotic drug, dose, and duration of therapy for uncomplicated infections. A recent study showed that embedding AOS in the electronic health records system can increase the proportion of guideline-concordant treatment regimens for urinary tract infections (UTI) and skin and soft tissue infections. The purpose of this study is to evaluate the impact of AOS on optimal antibiotic prescribing within primary care clinics across the Henry Ford Health Systems.

Methods: This is a single pre-test, post-test, quasi-experiment with a non-equivalent dependent variable. The pre-intervention period will include patients treated from December 2021â€“ January 2022 and the post-intervention period will include patients treated from February 2023 â€“ March 2023. Inclusion criteria include patients aged 18 years and older who presented to a primary care visit and were prescribed an oral antibiotic for the treatment of an uncomplicated lower respiratory tract infection (LRTI), acute bacterial skin and skin structure infections (ABSSI), or a UTI. Data collected will include patient demographics, indication for antibiotics, components of antibiotic prescription (i.e., drug, dose, and duration), revisit or hospitalization for recurrent infection, changes or escalation of antibiotic use, antibiotic-related adverse effects, and duration of symptoms prior to the clinic visit. Using a two-tailed alpha of 0.05, 80% power, and an effect size of 20%, a sample size of 100 patients were included for each pre- and post-group.

Results and Conclusion: Data is currently being collected, and results will be presented at the conference.

Learning Objectives:
Describe changes in prescribing patterns after implementing antibiotic order sentences for uncomplicated infections in outpatient primary care
Identify optimal antibiotic regimens for the outpatient treatment of uncomplicated infections
Self Assessment Questions:
Which of the following is not optimized by using antibiotic order sentences?
A. Drug selection
B. Drug dose
C. Drug duration
D. Drug allergies
What is the optimal treatment duration for cystitis when using nitrofurantoin 100 mg twice daily?
A. 3 days
B. 5 days
C. 7 days
D. 10 days
Q1 Answer: D Q2 Answer: B

Comparative efficacy of reduced-intensity conditioning regimens for allogeneic hematopoietic stem-cell transplant in acute myeloid leukemia and myelodysplastic syndromes: FluBu2-TLI vs. FluMel

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patients with acute myeloid leukemia (AML) and myelodysplastic syndrome (MDS) due to improved tolerability compared to myeloablative regimens. The two most commonly used regimens, fludarabine with busulfan (FluBu2) and fludarabine with melphalan (FluMel), have not been compared in prospective studies. Several retrospective studies have found increased non-relapse mortality (NRM) with FluMel, but decreased incidence of relapse, ultimately yielding similar results in overall survival. These studies vary in their inclusion criteria, and most have excluded the use of total lymphatic irradiation (TLI). The purpose of this study is to compare the efficacy and adverse effects of the two RIC regimens utilized at Henry Ford Hospital for allogeneic HSCT in the treatment of AML and MDS.
Methods: This is a retrospective cohort study of patients age 18 years and older with AML or MDS who underwent allogeneic HSCT from January 1, 2013 to December 31, 2021 and received fludarabine 120 mg/m2 plus busulfan 6.4 mg/kg and 200 cGy TLI or fludarabine 125 mg/m2 plus melphalan 140 mg/m2. Patients with prior history of HSCT transplant, cord blood source, or haploidentical donor were excluded. Data extracted from manual chart review includes patient age, gender, diagnosis, Karnofsky Performance Status, HSCT Comorbidity Index, disease risk index, donor stem cell source, relation to recipient, HLA matching status, CMV status, and prophylaxis for graft-versus-host disease (GVHD) and infection. The primary endpoint is incidence of relapse at 100 days post-transplant. Secondary endpoints include overall survival at one year, relapse-free survival at one year, incidence of acute and chronic GVHD, and the incidence of NRM. Patient factors may be incorporated into a multivariate analysis using a Cox proportional hazard model.
Results: To be presented at the Great Lakes Pharmacy Residency Conference.
Learning Objectives:
Identify the risks associated with hematopoietic stem cell transplant conditioning regimens.
Describe the differences observed in existing retrospective studies between FluBu2 and FluMel as reduced-intensity conditioning for allogeneic HSCT in AML and MDS.
Self Assessment Questions:

All of the following are risks to consider in choosing an HSCT conditioning regimen except:
A. Relapse
B. GVHD
C. Absolute Neutrophil Count
D. Infection
RIC regimens containing melphalan have been found to have greater ___ compared to those with busulfan in most retrospective studies.
A. Relapse
B. Overall survival
C. Time to engraftment
D. Non-relapse mortality
Q1 Answer: C Q2 Answer: D

An electronic decision support intervention to decrease inappropriate orders for urinalysis and urine cultures in hospitalized adults

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Background
Asymptomatic bacteriuria (ASB) is the presence of one or more species of bacteria in the urine in the absence of urinary tract infection (UTI) symptoms. The Infectious Disease Society of America (IDSA) recommends against screening for and treating ASB in most patient populations, as use of antibiotics to treat ASB does not improve clinical outcomes, may promote antimicrobial resistance, and may increase the incidence of adverse drug effects. Diagnostic stewardship interventions at the point of electronic ordering have the potential to decrease inappropriate prescribing for ASB by decreasing the identification of bacteriuria in asymptomatic patients.

Purpose/Objectives
The purpose of this quality improvement project is to decrease ordering of inappropriate laboratory tests for patients without an indication for UTI workup, and subsequently reduce inappropriate antibiotic utilization. The primary objective is to assess the impact of implementing clinical decision support within inpatient urinalysis (UA) and urine culture order panels on the rate of ordering at Froedtert Health. The secondary objective is to characterize the impact of embedded clinical decision support on treatment of ASB.

Methods/Outcomes
This is a pre-post quasi-experimental study comparing UA and urine culture (UC) orders pre- and post-intervention. Decision support will be added to the electronic health record for UA and UC orders. The primary outcome is the change in the number of UA and culture orders after implementation of clinical decision support. Secondary outcomes include incidence of inappropriate antibiotic treatment of ASB, percent accordance of indications selected within order panels with clinical documentation, percentage of UA orders that resulted in a UTI-supportive UA, number of UA and urine culture orders that were cancelled after initiation, and percent of UA orders for patients who had no appropriate indication.

Results/Conclusion
Data collection and analysis in progress.
Learning Objectives:
Describe the risks of prescribing antimicrobials for asymptomatic bacteriuria
Recall the benefit of diagnostic stewardship interventions to decrease inappropriate treatment of asymptomatic bacteriuria
Self Assessment Questions:
Which of the following is a risk of prescribing antimicrobials for asymptomatic bacteriuria?
A. Increased hospital length of stay
B. Adverse drug effects
C. Worsened clinical outcomes
D. Increased incidence of UTI
What is the benefit of a diagnostic stewardship intervention in the setting of decreasing inappropriate treatment of asymptomatic bacteriuria?
A. Decreases identification of bacteriuria in asymptomatic patients who donâ€™t require treatment
B. Increases screening for asymptomatic bacteriuria
C. Eliminates need for prospective audit and feedback by an antimicrobial stewardship team
D. Encourages testing for UTI in asymptomatic patients
Q1 Answer: B Q2 Answer: A

Standard Dose Fluconazole in Patients with Renal Dysfunction

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Background: Fluconazole is a triazole antifungal agent used for a variety of prophylactic and treatment indications. Prolongation of the corrected QT (QTc) interval and drug-induced liver injury (DILI) are reported adverse effects related to fluconazole use. Dosing guidelines at the study institution do not recommend fluconazole dose adjustment unless CrCl <10 mL/min and/or in the setting of end-stage renal disease (ESRD), whereas the manufacturer labeling recommends a 50% dosage reduction in patients with CrCl < 50 mL/min. The objective of this medication use evaluation was to quantify the percentage of patients with renal insufficiency who experienced adverse drug effects of fluconazole requiring drug discontinuation or dose adjustment in order to assess the institutionâ€™s dosing guideline appropriateness.

Methods: This medication use evaluation was a single-center, retrospective review of patients who received at least 400 mg of fluconazole daily for at least four consecutive days with CrCl â‰¤ 50 mL/min at the time of initiation. Adult patients admitted between September 1, 2018 and August 31, 2022 were eligible for inclusion. The primary outcome was discontinuation or dose reduction of fluconazole due to an adverse drug effect with a focus on DILI and QTc prolongation. The primary outcome, relevant lab values and EKG data were collected for eligible patients.

Results: A total of 100 patients were included in this review. Of those included, four patients (4%) had documented DILI leading to fluconazole discontinuation or dose reduction, and one (1%) experienced QTc prolongation in the setting of concomitant QTc prolonging medications.

Conclusion: Given that there is not a well-defined incidence of DILI or QTc prolongation related to fluconazole use, as well as the reversible nature of adverse effects primarily resulting from fluconazole, changes to clinical practice are not warranted at this time.

Learning Objectives:
Describe the incidence of drug-induced liver injury and QTc prolongation related to fluconazole use in the setting of renal impairment
Explain how the reported outcomes impact clinical practice and assessment of patients with renal insufficiency being treated with fluconazole
Self Assessment Questions:
The fluconazole package insert recommends dose reduction at which creatinine clearance?
A. â‰¤ 50mL/min
B. â‰¤ 30mL/min
C. â‰¤ 20 mL/min
D. â‰¤ 10mL/min
Fluconazole-related adverse drug effects are typically reversible
A. TRUE
B. FALSE
C. Blank
D. Blank
Q1 Answer: A Q2 Answer: A

Efficacy of Continuous Glucose Monitoring on Glycemic Control in Adults with Type 2 Diabetes

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Purpose: Frequent glucose measurements are critical for the management of diabetes mellitus (DM). Blood glucose monitoring (BGM) has been considered the standard care; however, it presents challenges with accuracy and adherence. Unlike BGM, continuous glucose monitoring (CGM) provides information about glucose trends, providing clinicians with greater ability to adjust a medication regimen. Data have demonstrated greater glycemic control with use of a CGM device, specifically in patients with type 1 DM, yet data evaluating efficacy of CGM in patients with type 2 DM (T2DM) exhibit inconsistent benefits. This study compares the effects of glucose monitoring strategies in patients with T2DM.

Methods: This retrospective cohort study evaluates patients with T2DM and a baseline glycated hemoglobin (HbA1c) of â‰¥8% who received care from an ambulatory care pharmacist within a large health system between July 1, 2021 and June 30, 2022. This study is approved by the Institutional Review Board. Patients were excluded if they began using a CGM system prior to their first pharmacy appointment or if there was current or planned use an insulin pump.
The primary objective of this study compares the change in HbA1c in patients using a CGM device versus patients receiving standard care by pharmacists. This is done by measuring the difference in HbA1c from baseline to a six-month follow-up period. Standard care is defined as patients who were instructed to check blood glucose at least one time daily. Secondary outcomes compare the number of diabetes medications, total daily dose of insulin, number and type of pharmacy interventions, emergency department visits or hospitalizations with a chief complaint relating to diabetes, and number of patients achieving an HbA1c of <8% between the two groups.

Results: Data collection is in progress and results will be analyzed upon completion.

Conclusions: Conclusion is pending data analysis.
Learning Objectives:
Review literature and current clinical practice guidelines regarding the use of CGM systems in patients with DM.
Discuss benefits of CGM systems in patients with T2DM.
Self Assessment Questions:
Which of the following is a difference between BGM and CGM?
A. Patients are generally more adherent to BGM when compared to CGM
B. BGM measures glucose at a single point in time, whereas CGM provides important information about glucose trends
C. BGM requires intermittent scanning by the user to store glucose values
D. BGM measures interstitial glucose and CGM measures blood glucose
Use of CGM systems have demonstrated these benefits in published literature:
A. HbA1c reduction
B. Reduction in hypoglycemic events
C. Reduction in time spent in hypoglycemia
D. All of the above
Q1 Answer: B Q2 Answer: D

Determining if patient and/or caregiver understanding of homegoing-medications is improved by pharmacist counseling and medication delivery from a transitions of care service

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Transitions of care (TOC) is the coordination of healthcare as a patient transfers between settings. This can include a wide range of services, such as medication reconciliation, patient counseling, bedside delivery, and others that meet patient needs. In the adult population, these services are effective at reducing avoidable hospital readmissions and decreasing mortality; however, in the pediatric population, there is a lack of literature surrounding these services and how this relates to the understanding of medications. In addition, there is a lack of standardization in services between institutions, which further complicates the application of literature to discharging patients. In acknowledgment of this gap, this study will be conducted to determine if patient/caregiver understanding of homegoing-medications is improved by medication counseling and bedside delivery from a pharmacist-run TOC service at a large, pediatric academic medical center.

Using hospital-wide, patient satisfaction surveys from 2021, patient/caregiver responses will be queried for two different questions about homegoing medications, relating to the understanding of both the indication and potential side effects. Approximately 700 encounters will be reviewed to determine if the patient opted-into receiving TOC services. This will be evaluated via pharmacy staff documentation in the electronic medical record. Patients will be divided into 2 groups for comparison and analysis of Likert-scale survey responses: those who received pharmacist-run TOC services, and those who did not. Survey responses regarding overall understanding of medications will be summarized as mean (standard deviation) or median [inter-quartile range] and compared between study groups using Studentâ€™s t-tests or Wilcoxon rank-sum tests where appropriate.

It is anticipated that patients/caregivers will have a better understanding of their medications after receiving bedside delivery and counseling from a pediatric-trained pharmacist. With this evidence, other pediatric institutions can implement TOC services within their pharmacistsâ€™ roles in order to improve medication comprehension and use.

Learning Objectives:
Identify the lack of literature surrounding the effectiveness of transitions of care services in the pediatric population
Recognize the pharmacistâ€™s role in providing services that enhance patient understanding of medication indications and potential side effects
Self Assessment Questions:
What services performed at adult and/or pediatric medical centers have been proven effective at improving patient comprehension of medications?
A. Bedside delivery and medication reconciliation
B. Medication counseling and providing sample medications at discharge
C. Medication reconciliation and readmission coordination
D. Providing sample medications at discharge and ensuring medication access
What was the identified need for this study (objective) due to lack of adequate literature?
A. Effectiveness of discharge medication reconciliation in adults with heart failure
B. Effectiveness of bedside delivery and counseling in pediatric patients
C. Effectiveness of refill coordination in adults with sickle-cell disease
D. Effectiveness of ensuring medication access in adults with asthma
Q1 Answer: A Q2 Answer: B

Impact of Pharmacy Led Process Improvement Model on Relative Readmission Risk Following Transitions of Care
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Joseph Regional Medical Center (SJRMC), there is an interprofessional collaboration between care management, family medicine residents, and ambulatory care pharmacy residents to conduct TOCs for patients within two primary care clinics. Despite this collaboration, hospital readmission rates of these patients remain high. The purpose of this study is to assess the relative readmission risk following a TOC process improvement model. Methods: The current TOC process includes the chief family medicine resident and an insurance quality report providing a daily discharge list from SJRMC to the care manager. In reviewing the discharge list, the care manager identifies high risk patients that meet the following criteria: seven or more chronic or acute medications and/or three or more selected chronic disease states (heart failure, diabetes, coronary artery disease, COPD, hypertension, or hyperlipidemia). Identified patients are then communicated to the ambulatory care chief resident through the electronic health record to disseminate within the pharmacy team to contact. Pharmacy residents attempt to contact the patient within 48 hours of the initial message and make 3 total attempts if no successful contact was made. Following attempts or successful contact, the pharmacy resident documents a TOC note in the patientâ€™s chart and sends it to the provider. A retrospective analysis was conducted on the current process to assess patient readmission risk related to various risk factors including: number of medications or disease states, medication concerns identified, and response to communication. Following this analysis, a new TOC protocol will be implemented to target potential identified care gaps and assess impact on readmission rates.
Results and Conclusions: This study is ongoing; therefore, the results and conclusions will be presented at the 2023 Great Lakes Pharmacy Resident Conference.
Learning Objectives:
Identify which components of Transitions of Care Management are required by Centers for Medicare and Medicaid Services (CMS) and other payors.
Recognize how readmission rates are affected by Transitions of Care Management.
Self Assessment Questions:
Which of the following statements is correct?
A. Medication Reconciliation & Management is not a requirement of Transitions of Care Management.
B. Medication Reconciliation & Management is a requirement of Transitions of Care Management.
C. Medication Reconciliation & Management can only be done by a pharmacist.
D. Medication Reconciliation & Management can only be done by the patientâ€™s primary care provider.
Which statement expresses how readmission rates are affected by Transitions of Care Management?
A. Readmission rates decrease.
B. Readmission rates increase.
C. Readmission rates are not affected.
D. Readmission rates are affected, but it is not known how they are affected.
Q1 Answer: B Q2 Answer: A

Evaluation of Doxycycline Versus Azithromycin in the Treatment of Chlamydia in Emergency Department (ED) Patients
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Chlamydia remains the most reported sexually transmitted infection (STI) in the United States with prevalence highest amongst persons aged â‰¤ 24 years old. Untreated, chlamydia infections can result in serious complications, particularly among women of child-bearing age. The CDC's 2021 STI treatment guideline recommends doxycycline 100 mg twice daily for 7 days as the standard of treatment, with azithromycin 1 g orally once or levofloxacin 500 mg orally for 7 days listed as suitable alternatives. This differs from the guidelineâ€™s 2015 recommendation of either doxycycline or azithromycin as treatment of choice in infected patients without preference. The change in recommendation stems from emerging data that suggests a reduction in efficacy of the azithromycin regimen in recent years when compared to doxycycline. However, concerns exist amongst practitioners regarding patient adherence to the doxycycline regimen especially since the ease of administration and low cost of the azithromycin makes it the more convenient choice.

Methods:

This is a retrospective, single center, observational, exploratory study that utilizes information obtained from the electronic medical record of 250 patients. It includes patients 18 years or older with documented chlamydial infections who were prescribed or received either azithromycin or doxycycline between January 1, 2019, and June 30, 2022. Pregnant women, children and incarcerated patients are excluded. The primary outcome of this study is the difference in rates of treatment success in patients treated with doxycycline versus those treated with azithromycin presenting with chlamydia in the ED. Secondary endpoints assess the rates of reinfection, patient adherence to their prescribed regimen based on dispensing records and rates of co-infection with other STIs.

Results:

Preliminary results appear to favor doxycycline over azithromycin as having higher treatment success rates. However, complete results and statistical analyses will be presented at the GLPRC conference.

Learning Objectives:

Review CDC recommended medication regimens for treatment of chlamydial infections.

Discuss the risks versus benefits of utilizing one treatment regimen over another within ED populations.

Self Assessment Questions:

Which of the following are recommended for the treatment of chlamydia according to the CDCâ€™s 2021 STI Treatment guideline?

A. Doxycycline 100 mg twice daily for 7 days
B. Azithromycin 1 g once
C. Levofloxacin 500 mg once daily for 7 days
D. Levofloxacin 500 mg twice daily for 7 days

According to data presented, which of the following infections should MOST LIKELY be treated empirically in patients with chlamydia presenting to the

A. HIV (Human Immunodeficiency Virus)
B. Syphilis
C. Gonorrhea
D. Trichomoniasis

Q1 Answer: D Q2 Answer: C

Effect of Implementing a Standardized Pharmacy Progress Note Associated with a Rapid Bacterial Identification System Protocol

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Antimicrobial stewardship has been a focus in many health systems to improve clinical outcomes and patient safety, as well as to combat antibiotic resistance. One important aspect of antimicrobial stewardship is the use of rapid diagnostic tests. VerigeneÂ® is an example of rapid diagnostic test that can detect bacteria in blood samples faster than conventional methods. While studies involving this and similar diagnostic tools has shown to be effective in reducing time-to-targeted antimicrobial therapy, the effectiveness of an associated pharmacy progress note has not been assessed.

Methods:
This retrospective quality improvement study will be conducted at Sparrow Hospital in Lansing, MI. Patients that have a positive blood culture with a VerigeneÂ® identification before and after the implementation of a progress note associated with the result of a VerigeneÂ® result will be examined. A sample of patients before the implementation of the progress note will be compared to a similarly sized sample of patients after the implementation of the note, both being from November to January of 2021-2022 and 2022-2023 respectively. The primary outcome will be hospital length of stay and the key secondary outcome will be time-to-targeted antimicrobial therapy, defined as the time from initiation of empiric antibiotics to the time of therapy change.

Other data points to be collected include: VerigeneÂ® bacterial identification, whether or not the identified bacteria is a pathogen or contaminant, the initial empiric antibiotic selection, and targeted therapy antibiotics. Exclusion criteria include patients aged <18 years, institutionalized patients (i.e. prisoners), or patients of diminished capacity. Also patients that die, are put into comfort care, or are transferred to other facilities will be excluded.

Results/Conclusions: In progress and will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:
Discuss the advantages and disadvantages of multiplex PCR rapid bacterial diagnostic tests for bloodstream infections
Identify an appropriate treatment regimen based on VerigeneÂ® culture results
Self Assessment Questions:
What is a disadvantage of the multiplex PCR rapid bacterial diagnostic test for bloodstream infections?
A. It is not significantly faster than conventional methods of identification
B. It loses sensitivity when dealing with polymicrobial specimens
C. Multiplex PCR tests only allow for testing of gram-positive organisms
D. No Multiplex PCR test tests for fungi
PD is a 53 year old male is currently receiving vancomycin for bacteremia and has a positive VerigeneÂ® culture indicating S. aureus that is negative for the MecA gene. The patient has no known allergies. What is the most appropriate next step for the pharmacist to recommend?
A. Wait until conventional sensitivities return for the organism
B. Continue vancomycin therapy
C. Switch to IV linezolid 600 mg q 12 hours
D. Switch therapy to IV cefazolin 2 g q 8 hours
Q1 Answer: B Q2 Answer: D

Establishing team-based weight management services in primary care clinics

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A large percentage of Americans are overweight or obese. These patients are at greater risk of health complications compared to healthy weight individuals. Only a small percentage of patients are successful in self-directed weight loss. There is a need for increased involvement of healthcare professionals to assist patients in managing their weight. Team-based care and interpersonal collaboration have demonstrated better patient outcomes than primary care provider management alone in other diseases such as diabetes and hypertension. This study is a retrospective trial comparing outcomes in team-based weight management services and primary care provider weight management services alone.
The study will include patients with medical weight management services performed in the past year by a provider at one of the Indiana University Health Southern Indiana Physician Clinics. Team-based weight management will incorporate a provider for continuous assessment and an ambulatory care pharmacist for weight loss medication management or a nurse for patient education and accountability. The objectives of the study are to compare percent weight loss, changes in patient outcomes, access to care, and revenue between team-based weight management and provider weight management. Descriptive statistics will be utilized for the data points collected. The current team-based weight management model at Indiana University Health Southern Indiana Physicians does not have a standardized workflow therefore, process improvement strategies will be implemented. The development of a weight management care map will create a systematic approach to guide healthcare professional collaboration and referrals. Patient education handouts will be created to provide information on weight management resources. An educational learning module for healthcare professionals will discuss motivational interviewing and the appropriate utilization of patient-centered language during weight management appointments. These additional interventions will aid in the development of a standardized team-based weight management workflow and continuity of care.
Learning Objectives:
Identify appropriate patient-centered language for weight management patients.

Describe motivational interviewing interaction techniques.

Self Assessment Questions:

Which of the following is a preferred term when discussing obesity in clinical practice?

A. Heaviness
B. Excess fat
C. Obesity
D. Unhealthy body weight

Which of the following is a motivational interviewing interaction technique?

A. close-ended questions
B. affirmations
C. passive listening
D. education

Q1 Answer: D Q2 Answer: B

Comparison of toxic alcohol exposures reported to the Indiana Poison Center before and after legalization of Sunday alcohol sales in Indiana: a retrospective cohort study

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sales in Indiana on March 4, 2018.

Methods: This retrospective cohort study evaluated all toxic alcohol exposures reported to the Indiana Poison Center between 1/1/2015 and 12/31/2021. Exposures between 1/1/2015 to 3/3/2018 and 10/31/2018 to 12/31/2021 made up the control and intervention groups, respectively. Cases whose reason for exposure was coded as â€œunintentionalâ€â€œintentional â€“ suspected suicideâ€â€œadverse reactionâ€â€œother â€“ maliciousâ€and â€œother â€“ contaminant/tamperingâ€or had unknown outcome were excluded. The primary outcome was hospital admission rate between groups. Secondary endpoints included level of CNS depression (none vs. mild/moderate vs. major), severity of outcome (no effect/minor effect vs. moderate effect/major effect/death), and whether clinical effects lasted more or less than 24 hours. All endpoints were analyzed via Chi-squared test.

Results: A total of 351 cases were included, with 194 cases in the control group and 157 cases in the intervention group. There was no significant difference in the primary outcome (54% vs. 42%; p=0.724). No CNS depression (63% vs. 77%) and minor/moderate CNS depression (31% vs. 19%) were significantly different between the control and intervention groups, respectively (p=0.023). The control time period saw higher rates of no effect/minor effects than the intervention group (51% vs. 39%; p=0.029). There was no difference in clinical effects lasting more than 24 hours (30.9% vs. 34.3%; p=0.490).

Conclusion: Legalization of Sunday alcohol sales did not affect hospitalization rates attributed to toxic alcohol exposure among cases reported to the Indiana Poison Center.

Learning Objectives:

Identify common chemicals and products related to toxic alcohol exposures.
Discuss common treatments for toxic alcohol exposures.

Self Assessment Questions:

Which of the following ingredients is commonly used in rubbing alcohol?

A. Ethylene glycol
B. Ethanol
C. Methanol
D. Isopropyl alcohol

Which of the following is the most appropriate treatment option for a patient presenting with a methanol level of 25 mg/dL and minor CNS depression?

A. Fomepizole
B. Continuous renal replacement therapy
C. Chlordiazepoxide
D. Ethanol

Q1 Answer: D Q2 Answer: A

A Comprehensive Analysis to Make Fluorouracil (5-FU) Infusions at Veteran Health Indiana (VHI)

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Purpose: Fluorouracil (5-FU) is a vital drug in many chemotherapy regimens. On the day of infusion, patients are scheduled for other chemotherapy infusions in addition to an extended regimen of 5-FU. Timely administration of all IV infusions may decrease patient wait time and allow for timely discharge to the comfort of their home. A comprehensive analysis to determine the operational and financial requirements of making 5-FU infusions at VHI compared to outsourcing this service will be beneficial in implementing an efficient insourcing process that will result in decreased patient wait time and improved satisfaction in the care provided.
Methods: The current process for continuous 5-FU infusion procurement and administration is evaluated using lean process improvement tools such as process mapping, barrier identification, determining root cause of barriers, development of solutions, and implementation of solutions. In addition, a cost-benefit analysis will be conducted to determine the financial implications of insourcing 5-FU infusions at VHI compared to outsourcing from a 503A compounding company.
Results and conclusions: Making 5-FU infusions at VHI will decrease patient wait time for the 5-FU infusion to be started and improve satisfaction in the care provided. A standard operating procedure document for making 5-FU infusions at VHI would be essential to ensure a uniform and consistent process. The results of this comprehensive analysis will be discussed at Great Lakes Pharmacy Residency Conference in April.

Learning Objectives:
Discuss the current fluorouracil (5-FU) infusion process at Veteran Health Indiana.
Review the ability and impact of compounding continuous 5-FU infusions vs continue to outsource to a 503A compounding pharmacy.
Self Assessment Questions:
Which of the following is an advantage of compounding continuous fluorouracil (5-FU) infusions at Veteran Health Indiana?
A. Increase patient wait time
B. Decrease patient satisfaction
C. Decrease patient wait time
D. Increase patient treatment cycle
Which of the following document is vital to ensure a uniform and consistent fluorouracil (5-FU) infusion process?
A. Return on investment
B. Medical center policy
C. Standard operating procedure
D. Medication use evaluation
Q1 Answer: C Q2 Answer: C

Predictors of Enoxaparin Prophylaxis Failure
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BACKGROUND: Venous thromboembolism (VTE) is a significant cause of morbidity and mortality in hospitalized patients. Several risk factors predispose hospitalized patients to the development of VTE, including prolonged immobility, obesity, age, and recent surgery. Mechanical and pharmacological prophylaxis (typically consisting of low molecular weight heparins (LMWHs) such as enoxaparin) are regarded as standard of care in most institutions in order to reduce the risk of this complication. While there is ample literature supporting the efficacy of these agents, data regarding the optimal dosing to prevent VTE is not well established, especially in patients at higher risk due to obesity.
METHODS: In this single-center, retrospective review, patients that received enoxaparin prophylaxis will be stratified into two cohorts: those who were diagnosed with a VTE that was not present on admission and those who were not diagnosed with a VTE during their admission. Patients were matched based on their admission SOFA score, admission date (within two years), and enoxaparin order. Patients in the case cohort were excluded if they received > 0.75 mg/kg/dose for VTE prophylaxis.
OUTCOMES: The purpose of this study was to identify a weight-based enoxaparin dose that is independently associated with a significant decrease in VTE. Additional analyses were also conducted to identify patient-specific factors that are independently associated with the failure of enoxaparin VTE prophylaxis.
RESULTS AND CONCLUSIONS: Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.
Learning Objectives:
Discuss patient-specific factors that have been associated with an increased risk of venous thromboembolism (VTE) in hospitalized patients
Select an appropriate dose of prophylactic enoxaparin based on patient-specific factors
Self Assessment Questions:
Which of the following risk factors is associated with an increased risk of venous thromboembolism (VTE)?
A. Obesity
B. Recent surgery
C. Prolonged immobility
D. All of the above are associated with an increased risk of VTE

Which of the following regimens is an FDA-approved prophylactic dose of enoxaparin for an adult patient with normal renal function (CrCl >30 ml/min) and a body mass index (BMI) within the healthy weight range?

A. Enoxaparin 1 mg/kg based on actual body weight SC every 12 hours
B. Enoxaparin 60 mg SC every 24 hours
C. Enoxaparin 40 mg SC every 24 hours
D. Enoxaparin 30 mg SC every 12 hours

Q1 Answer: D Q2 Answer: C

Evaluation of Metformin Monitoring Practices: Vitamin B12 Levels and Frequency of Testing in Chronic Metformin Users

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common side effects are gastrointestinal in nature, patients taking metformin may also experience vitamin B12 deficiency with long-term use. Despite the frequent use of metformin, published data suggests that many patients do not receive routine laboratory monitoring for vitamin B12 deficiency. The objective of this study is to characterize vitamin B12 testing and supplementation within the Gundersen Health System.

Methods: A retrospective review was performed on medical records for all patients 18 years and older at Gundersen Health System taking metformin at a total daily dose of at least 1,000 mg for at least one year within the five-year period encompassing November 1, 2017 â€“ October 31, 2022. The primary outcomes were the fraction of patients who had a vitamin B12 level checked at least once since initiating metformin and the average vitamin B12 level in patients who were tested. Secondary outcomes were the frequency of vitamin B12 level monitoring and the frequency of vitamin B12 supplementation.

Results/Conclusion: Data collection and analysis are underway with results to be presented at the 2023 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe current practice guidance from national consensus organizations regarding vitamin B12 monitoring parameters for patients taking metformin chronically.

Identify systemic complications that may result from a vitamin B12 deficiency.

Self Assessment Questions:

Which is true of American Diabetes Association vitamin B12 monitoring recommendations for patients taking metformin chronically?

A. measure a serum B12 level every 5 years
B. monitoring is generally not necessary in patients less than 80 years old
C. patients with anemia should have their B12 level checked every 3 years
D. vitamin B12 should be measured periodically (sometimes interpreted as annually)

GP presents for an annual wellness visit. They have been on metformin 2,000 mg ER daily for the past 5 years. Their medical history (year diagnosed) is significant for COPD (2009), gout (2010), type 2 diabetes (2017), neuropathy (2021), and hypertension (2021). Which of these conditions could be caused by a vitamin B12 deficiency that may be attributable to metformin use?

A. COPD
B. gout
C. neuropathy
D. hypertension

Q1 Answer: D Q2 Answer: C

Impact of pharmacist implementation in an interstitial lung disease clinic

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irreversible and worsen with time, therefore treatments are focused on slowing disease progression making medication adherence an essential component of ILD management. The immunosuppressants and antifibrotics used to treat ILD require extensive laboratory monitoring and are associated with numerous adverse drug effects (ADEs). Pharmacists are uniquely suited to identify and manage drug interactions, ADEs, and provide patient-centered counseling on symptom management. A multidisciplinary approach to ILD management has become the standard of care; however, there are limited studies that assess patient outcomes when a pharmacist is directly involved in medication management.

Purpose: The purpose of this study is to evaluate the clinical and financial impact of the addition of a pharmacist to the collaborative ILD monitoring program.â€¯â€¯

Methods: This is a retrospective, quasi-experimental analysis of adults with ILD receiving immunosuppressant and/or antifibrotic therapy from January 1, 2016 to July 31, 2022. Patients are grouped according to whether they had the clinical pharmacist involved in their medication management. Exclusion criteria include patients whose medications were primarily managed by a non-pulmonary specialist, patients under 18 years old, prisoners, pregnant patients, and those enrolled in hospice. The primary endpoint is rate of drug discontinuation due to ADEs. Secondary endpoints include time to first patient contact, time to prior authorization, rate of dose reductions, and number of medication changes. Multivariable logistic regression will be used to analyze potential factors associated with drug discontinuation. Statistical analysis will be conducted using Fisherâ€™s exact test and a Wilcoxon rank-sum test for categorical and continuous variables, respectively. To adjust for baseline factors, a sensitivity analysis via propensity score matching will be performed.

Results & Conclusion: Will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe the role of the pharmacist in the multidisciplinary management of patients with interstitial lung disease.

Identify the strategies used by the pharmacist to prevent drug discontinuation in patients with interstitial lung disease.

Self Assessment Questions:

What aspects of ILD management does the pharmacist take part in?

A. Diagnosis via lung biopsy, high-resolution computed tomography, and clinical symptoms

B. Medication counseling, laboratory monitoring, and supportive care management

C. Prescribing oxygen therapy, choosing appropriate medications, and recommending for transplant

D. Triaging patient calls, providing resources and support education, and leading goals of care discussions

Which of the following is NOT a strategy utilized by the pharmacist to minimize antifibrotic discontinuation due to adverse effects?

A. Taking medication with high-protein meals

B. Short-term use of antidiarrheal medications

C. Taking medication on an empty stomach

D. Dose reduction

Q1 Answer: B Q2 Answer: C

Implementation and Evaluation of a Pharmacist Led DOAC Management Service

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Purpose: Direct Oral Anticoagulants (DOACs) are known for their improved safety, ease, and pharmacokinetic profile compared to vitamin K antagonists, yet they remain high-risk medications themselves. They require patient-specific and indication-specific dosing, stringent adherence, and adverse event monitoring. With varying considerations for each DOAC agent, inappropriate dosing occurs frequently. The Joint Commission includes DOACs in their National Patient Safety Goal to â€œreduce the likelihood of patient harm associated with the use of anticoagulation therapy,â€ emphasizing the need to establish management services. For decades, pharmacists have successfully managed anticoagulation services, demonstrating that optimal management decreases bleeding events, thrombotic events, and the overall utilization of healthcare resources. With the known risks of DOAC therapy and pharmacist led anticoagulation services already established, there are compelling reasons for pharmacists to incorporate DOAC therapy management into their existing framework. The purpose of this research is to determine the impact of a pharmacist led DOAC management service on patient adherence and appropriate dosing.

Methods: A prospective interventional study was performed to evaluate the implementation of a pharmacist led DOAC service. A search report via the electronic medical record identified patients within the Saint Joseph Health System currently prescribed a DOAC agent. These patients were then evaluated for appropriateness of therapy and their provider was contacted with any concerns or recommendations. The patients were called to assess adherence, adverse effects, and to provide patient education. At an indicated interval, this call was repeated for reassessment. The primary outcome is the change in the average number of doses missed during the week. Secondary outcomes include the percentage of patients with inappropriate DOAC therapy upon evaluation, the number of pharmacist recommendations, and the percentage of provider acceptance.

Results/Conclusion: Data collection and analysis are ongoing. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:
Review key pharmacokinetic principles of DOACs and relate them to the importance of adherence.
Discuss common factors that affect adherence and the impact that pharmacists can make on those factors.
Self Assessment Questions:
Why should rivaroxaban 20mg be taken with food?
A. To improve GI tolerability
B. To increase the likelihood of adherence
C. To increase the AUC
D. To increase the half life
What is the list price of a 1-month supply of Eliquis?
A. 623
B. 561
C. 358
D. 275
Q1 Answer: C Q2 Answer: B

Association of Vancomycin-Induced Acute Kidney Injury with Trough Versus AUC Monitoring in Patients Receiving Extended Durations of Therapy

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Purpose: Vancomycin therapy is associated with an increased risk of acute kidney injury (AKI). Previous studies suggest that area under the curve (AUC) monitoring reduces the risk of AKI, but literature are lacking to support this in patients receiving longer durations of vancomycin therapy. The goal of this study was to assess the clinical impact of AUC monitoring on patients receiving at least 14 days of vancomycin therapy.

Methods: Patients who were â‰¥18 years old, admitted between August 2015 to July 2017 or October 2017 to September 2019, and received at least 14 days of vancomycin therapy were included in the study. Our primary outcome was the incidence of AKI between trough monitoring and AUC monitoring groups using Kidney Disease Improving Global Outcomes (KDIGO) criteria. Secondary outcomes included inpatient mortality, median inpatient length of stay (LOS), and median intensive care unit (ICU) LOS.

Results: A total of 582 patients were included in the study. The majority of patients were male (58.2%) and Caucasian (94.3%). The median duration of vancomycin therapy was 23 days (interquartile range [IQR], 16-39). Patients within the trough monitoring group had a higher incidence of AKI compared to the AUC monitoring group (45.6% vs. 28.4%, p<0.001). Furthermore, logistic regression analysis showed AUC monitoring was associated with a 54% lower incidence of AKI (OR 0.46, 95% CI [0.31-0.69]). ICU length of stay within the trough monitoring group was longer compared to the AUC monitoring group (13 days [6-24] vs. 10 days [3-19], p=0.008). All-cause inpatient mortality was numerically higher in the trough monitoring group (41% vs. 22%, p=0.078).

Conclusion: In patients who received at least 14 days of vancomycin therapy, AUC monitoring was associated with a lower incidence of AKI compared to trough monitoring.

Learning Objectives:
Discuss current IDSA/ASHP/SIDP recommendations regarding vancomycin therapeutic monitoring
Describe the clinical impact of AUC monitoring on patients receiving extended durations of vancomycin therapy
Self Assessment Questions:
Prior to the updated 2020 IDSA/ASHP/SIDP guidelines, which of the following was the target vancomycin trough concentration that was believed to correlate with an AUC of 400 - 600 mg*h/L?
A. 15 - 20 mg/L
B. 10 - 15 mg/L
C. <10 mg/L
D. None of the above
A patient that you are currently caring for has a vancomycin trough level that resulted as 20mg/L. What adverse effect is this patient at a higher risk for developing?
A. Nephrotoxicity
B. Clostridioides difficile infection
C. Vancomycin infusion reaction
D. None of the above
Q1 Answer: A Q2 Answer: A

Incidence of anti-hypertensive therapy initiation in patients taking serotonin and norepinephrine reuptake inhibitors: an evaluation of potential prescribing cascades at Gundersen Health System

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Purpose:

Inappropriate prescribing practices remain major contributors to excess healthcare costs and patient morbidity, with one such avenue involving the prescribing cascade. Prescribing cascades occur when the adverse effect of one medication is misinterpreted as a new condition requiring independent intervention. To date, a multitude of prescribing cascades have been identified with the use of non-steroidal anti-inflammatory drugs, thiazide diuretics, and antipsychotics. Despite known impacts on hemodynamic parameters, limited research has been conducted regarding the use of serotonin and norepinephrine reuptake inhibitors (SNRIs) and potential prescribing cascades involving anti-hypertensive medication initiation.

Methods:

This IRB-approved, retrospective, case-control study included patients receiving outpatient care through the regional clinics of Gundersen Health System from September 1, 2016 through September 1, 2021. Patients in the study group consisted of adults â‰¥ 18 years old with an active SNRI prescription (i.e. duloxetine, venlafaxine, desvenlafaxine, milnacipran, or levomilnacipran). The control group included adults â‰¥ 18 years old who did not have active SNRI prescriptions but were otherwise matched with the study group based on patient specific demographic and medical characteristics. Patients were excluded if they had documented histories of Cushingâ€™s syndrome, neoplasm of the adrenal gland, primary aldosteronism, hyperthyroidism, pre-existing hypertension, or had active prescriptions for medications known to increase blood pressure. The primary outcome measure was initiation of any antihypertensive medication within the studyâ€™s timeframe, with therapy initiation considered attributable to a SNRI if prescribed within 12 months of the SNRI.

Results:

Final results will be presented at the Great Lakes Pharmacy Resident Conference. An estimated 1000 patients will be reviewed in this study, with approximately 500 patients being assigned to each respective cohort.

Learning Objectives:

Identify previously described prescribing cascades among commonly utilized medications.

Describe patient-specific factors and components of a patient's past medical history that may raise concern for initiating serotonin and norepinephrine reuptake inhibitor (SNRI) therapy.

Self Assessment Questions:

Which of the following drug pairs reflects a known prescribing cascade?

A. ACE inhibitors â† Xanthine oxidase inhibitors
B. HMG-CoA reductase inhibitors â† Loop diuretics
C. Calcium channel blockers â† NSAIDs
D. Antipsychotics â† Antiparkinsonian agents

Based on serotonin and norepinephrine reuptake inhibitor (SNRI) mechanism of action, which of the following components of a patientâ€™s past medical history may raise concern about initiating a SNRI?

A. Gout
B. Hypertension
C. Type 2 diabetes mellitus
D. Fibromyalgia

Q1 Answer: D Q2 Answer: B

Glucose Control in ICU Patients with COVID-19 Pandemicc

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potential direct effects of the virus on pancreatic function. Critically ill patients may develop stress induced hyperglycemia requiring vasopressors and corticosteroids, which in turn can cause variable blood glucose levels. Additionally, previous studies of patients diagnosed with COVID have demonstrated worsened hyperglycemia due to damage to pancreatic Î²-cells. To reduce nursing exposure, Trinity Health Oakland (THOH) initiated a COVID bundle which aimed to optimize basal-bolus insulin regimens and avoid IV insulin infusions. The effects of this intervention on patient outcomes are unknown. The primary objective of this study is to compare time in goal blood glucose range for COVID versus non-COVID patients in the ICU.

Methods: This is a single-center, retrospective cohort study, conducted from December 1, 2020, to December 31, 2021. Adult THOH medical ICU service patients admitted for > 48 hours, receiving at least one dose of subcutaneous long-acting insulin or IV infusion for > 24 hours were included. Patients were divided into two groups, those with a primary diagnosis of COVID versus a control group of non-COVID patients in the ICU on mechanical ventilation and empirically treated for sepsis. Patients were excluded if they were pregnant, treated for diabetic ketoacidosis, or treated with high-dose insulin euglycemic therapy for overdose. A sub-group analysis was conducted to compare subcutaneous basal-bolus insulin to IV insulin infusion regimens. Secondary efficacy, safety, and clinical outcomes were collected. Efficacy outcomes included percent of hyperglycemic readings and time to goal blood glucose range. Safety outcomes included incidence of hypoglycemia. Ventilator days, length of stay, and mortality were defined as clinical outcomes.

Learning Objectives:
Review recommendations for hyperglycemia management in critically ill patients.
Explain potential mechanisms for worsened glycemic control in COVID-19 patients.
Self Assessment Questions:
The American Diabetes Association recommends which of the following for patients with hyperglycemia in the hospital setting?
A. Insulin therapy should be initiated when there is persistent hyperglycemia > 130 mg/dL
B. Utilize sliding scale insulin regimens for hospitalized patients with poor nutrition intake
C. IV insulin infusions are preferred in critically ill hospitalized patients
D. Target blood glucose ranges < 110 mg/dL in hospitalized patients
Which of the following is true regarding potential mechanisms for hyperglycemia in patients with COVID in the ICU?
A. COVID may lead to direct damage of pancreatic Î²-cells
B. Patients need more frequent blood glucose monitoring
C. The cytokine storm and inflammatory response associated with COVID is not expected to contribute to hyperglycemia
D. Vasopressors and corticosteroids should not contribute to hyperglycemia
Q1 Answer: C Q2 Answer: A

Prescribing patterns of direct oral anticoagulants for extended-phase anticoagulant therapy

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Venous thromboembolism (VTE) is a common cause of morbidity and mortality. Treatment with Vitamin K antagonists or direct oral anticoagulants (DOACs) is recommended for at least 3 months. Using anticoagulants beyond 3-6 months has shown reduction in VTE risk but also concomitantly increased risk of bleeding and may be preserved for patients at higher risk of recurrent VTE events. The 2021 CHEST guideline update suggests reduced dose over full-dose apixaban or rivaroxaban for extended-phase anticoagulant therapy, however, no explicit criteria or guidance is provided on which patient populations may benefit from dose reduction. The objective of this study is to identify how many patients on apixaban or rivaroxaban for extended-phase anticoagulant therapy for prevention of VTE recurrence are on reduced-dose vs full-dose and to describe the characteristics of those on reduced-dose vs full-dose.

This is a single-center, retrospective, observational study. Adults on rivaroxaban or apixaban for VTE which occurred > 6 months prior will be included in the study. Pregnant women and patients on apixaban or rivaroxaban for indications other than VTE will be excluded. The following data will be collected: age, gender, weight, BMI, medical history, medication history, pertinent labs, major bleeding events, number of patients on reduced-dose vs. full-dose of apixaban or rivaroxaban. The primary outcome will be to quantify number of patients on reduced-dose vs. full-dose of apixaban or rivaroxaban for extended-phase anticoagulation therapy for prevention of VTE recurrence. Secondary outcomes will include identifying patient specific characteristics that may be more common in patients on reduced-dose or full-dose apixaban or rivaroxaban and recurrent symptomatic VTE or VTE-related death. The safety endpoints will be to evaluate any major or minor bleeding events.

Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.
Learning Objectives:
Discuss A. Discuss current evidence for use of oral anticoagulants during extended-phase anticoagulant therapy to prevent VTE recurrence
Identify B. Identify patient specific characteristics to consider when choosing between low-dose and full-dose anticoagulants for extended-phase anticoagulation.
Self Assessment Questions:

Which of the following VTE management strategies is suggested by the 2021 CHEST guideline update for extended phase anticoagulant therapy?
A. Use full-dose apixaban or rivaroxaban in patients who have been selected to receive extended-phase anticoagulant therapy
B. Use reduced-dose apixaban or rivaroxaban in patients who have been selected to receive extended-phase anticoagulant therapy
C. Warfarin is the preferred anticoagulant for extended-phase anticoagulant therapy
D. Lifetime anticoagulation is suggested in all patients once diagnosed with a VTE
Which patient-specific variable(s) should be considered when choosing an anticoagulant and dosage during extended-phase anticoagulant therapy?
A. BMI
B. Renal function
C. Cost
D. All of the above
Q1 Answer: B Q2 Answer: D

Evaluation of the Antibiotic Spectrum Utilized in Open Fractures at Level I Trauma Centers

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Background: Currently, a majority of the evidence available for prophylactic antibiotic use in open fractures primarily evaluates the duration of antibiotics or time to administration, not the choice of antibiotics. Open fracture guidelines only recommend gram positive coverage or first generation cephalosporins for Gustilo fracture types I and II and addition of an aminoglycoside for Gustilo fracture type III.

Purpose: The purpose of this study is to evaluate the utilization of guideline directed antibiotic spectrum of activity in open fractures at level I trauma centers within a hospital system.

Methods: This is a retrospective cohort study that evaluates the utilization of guideline directed antibiotic spectrum of activity in open fractures at level I trauma centers within a hospital system from October 1, 2015 through June 30, 2022. The primary outcome of this study is the development of fracture related infection within 60 days. Secondary outcomes will include compliance with guideline directed antibiotic spectrum of activity within 72 hours of presentation, antibiotic choice, primary organisms growing in cultures, Clostridioides difficile infection rates within 30 days, and organismsâ€™ resistance rates. Adult patients will be identified by ICD 10 codes for open fractures through the electronic medical record. Patients will be excluded if they are transferred into the facility, are under 18 years of age, pregnant, incarcerated, death within 24 hours, determination of brain death, or undergo emergent abdominal surgery. Baseline characteristics such as age, gender, race/ethnicity, height, weight, body mass index, allergies, creatinine clearance, length of stay, disposition, Gustilo fracture type and location, mechanism of injury, gross soil contamination, tetanus vaccination administration, and hospital location will be collected. Antibiotic information (drug, dose, and duration), cultures, fracture related infection, and Clostridioides difficile infection will be collected for analysis.

Results/Conclusion: Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.
Learning Objectives:
Relate the incidence of infection with the various Gustilo fracture type.
Recognize the appropriate antibiotic choice based on the Gustilo fracture type and wound presentation.
Self Assessment Questions:
Patient KS presents to the emergency department with an open humerus fracture that must go to the operating room for urgent repair due to extensive vascular injury threatening limb preservation (Gustilo fracture type IIIC). What is KSâ€™s risk of infection?
A. 0-9%
B. 1-12%
C. 0.42
D. 0.52
Patient RL presents to the emergency department after having their foot ran over by a riding lawn mower, resulting in a Gustilo fracture type II.
A. Cefazolin
B. Cefazolin + Metronidazole
C. Cefazolin + Gentamicin
D. Cefazolin + Vancomycin
Q1 Answer: C Q2 Answer: B

Improving Cefazolin Use in Patients with a Reported Penicillin Allergy for Surgical Prophylaxis

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Purpose: Cefazolin is considered first-line for perioperative antibiotic prophylaxis in many common surgeries; however, it is often substituted for a non-beta-lactam agent in patients with a reported penicillin allergy. An overwhelming majority of these patients lack a true immunoglobulin E (IgE) mediated reaction and subsequently receive suboptimal therapy, increasing their risk for surgical site infections, extended lengths of stay, and higher costs of care. The purpose of this study is to improve rates of cefazolin use for surgical prophylaxis in patients with a labeled penicillin allergy.

Methods: This was a single-center, pre-post interventional study conducted at a large rural community hospital in Midland, MI. Patients aged 18 or older with a documented penicillin allergy and anticipating elective surgery within the prespecified time period were eligible for inclusion. The intervention consisted of two components: targeted education and order set updates. Leaders of antimicrobial stewardship met with providers from several surgical sub-specialties during departmental meetings to discuss improving perioperative antibiotic prophylaxis in penicillin allergic patients. Additionally, surgical order sets were updated to remove inaccurate clinical decision support alerts concerning cefazolin use in the setting of a non-anaphylactic & anaphylactic penicillin allergy. Recommendations published in the Journal of Allergy & Clinical Immunology: Drug Allergy Update 2022 were referenced as the basis for the education provided. The effectiveness of the intervention was assessed by comparing the use of cefazolin for surgical prophylaxis in the post-intervention group to the pre-intervention group.

Results: Data is currently being collected, and results will be presented at the Great Lakes Pharmacy Residency Conference

Learning Objectives:

Explain the importance of the R1 side chain in Î²-lactam allergic cross-sensitivity and identify which cephalosporins have a structurally similar/dissimilar R1 side chain to penicillin

Recall consensus-based statements published in the 2022 Drug Allergy Practice Parameter Update regarding the use of cephalosporins in patients with a documented penicillin allergy and apply them to practice

Self Assessment Questions:

Which of the following cephalosporin antibiotics has a similar R1 side chain to penicillin and is correctly paired with its corresponding cross-sensitivity potential?

A. Cephalexin; potentiates cross-reactivity
B. Cefepime; doesnâ€™t potentiate cross-reactivity
C. Ceftriaxone; potentiates cross-reactivity
D. Cefadroxil; doesnâ€™t potentiate cross-reactivity

2.ÏMO is 64 y/o male undergoing a total knee arthroplasty. His EMR displays a weight of 121 kgs and has a listed drug allergy of anaphylaxis to amoxicillin which occurred in 2015. Which of the following antibiotics is the best choice for surgical prophylaxis?

A. Clindamycin 900mg
B. Vancomycin 1750mg
C. Cefazolin 3g
D. Levofloxacin 500mg

Q1 Answer: A Q2 Answer: C

Expansion of a Pharmacist-Led Glucose Management Service in a Community Hospital Setting

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Patients with type 2 diabetes admitted to a hospital are best supported by a multidisciplinary approach and coordinated transitions-of-care. At a 150-bed community hospital, a pharmacist-led glucose management service was piloted on a single medical unit to implement glycemic management best practices. The purpose of this quality improvement project is to enhance the existing pharmacist-led glycemic management policy while expanding the service to all acute care hospital units.

Methods

Initial phase data was utilized to update and refine the pharmacist-led glycemic management policy associated with this service. Feedback sessions were held with clinical pharmacists to determine policy revisions. The service was then expanded to all acute care inpatient units. Data from the pharmacist-managed group was compared to data collected for a randomized group of hospitalist-managed patients; specifically, hemoglobin A1c, prior to admission diabetes medications, number of days until an in-range blood glucose reading was reported, number of days in controlled range, and hypoglycemia rates.

Preliminary Results

Overall, the pharmacist-managed group included a greater percentage of patients that were older, not utilizing sliding scale insulin, on at least one oral diabetes medication prior to admission, and/or on steroids during admission. Approximately 86% of patients in the pharmacist-managed group were out of controlled blood glucose range at the time of pharmacist-management consultation, compared with 68.4% of provider-managed patients. Additionally, the average length of admission was longer in the pharmacist-managed group due to non-glycemic management related issues ($p = 0.55$). However, the hypoglycemia rate was less than 0.5% in both pharmacist-managed and provider-managed groups.

Conclusions

Pharmacists managed patients similarly to providers with regards to blood glucose management, hypoglycemic events, and the time taken to reach blood glucose goal. The expansion of this program will allow pharmacists to better support medication management and patient outcomes while practicing at the top of their license.

Learning Objectives:

Describe the process of expanding the pharmacist-led glycemic management service

Explain the outcomes of the implemented glycemic management service with regards to glycemic control and patient safety

Self Assessment Questions:

What are the required steps before expanding the pharmacist-led glycemic management service?

A. Data from the pharmacist-managed group will be compared to data collected for a randomized group of hospitalist-managed patients

B. Initial phase data will be utilized to update and refine the pharmacist-led glycemic management policy

C. Feedback sessions will be held with clinical pharmacists to determine policy revisions

D. B and C

What were outcomes of the implemented glycemic management service with regards to glycemic control and patient safety?

A. Hospitalist-managed group included a greater percentage of patients that were older, on one or more oral diabetes medications prior to admission, and/or on steroids during admission

B. A greater percentage of patients in pharmacist-managed group were in controlled blood glucose range at the time of consult compared with provider-managed patients

C. The average length of admission was longer in the hospitalist-managed group due to non-glycemic management related issues.

D. The rate of hypoglycemia was less than 0.5% in both pharmacist-managed and provider-managed groups

Q1 Answer: D Q2 Answer: D

Incidence of Pancreatitis with Incretin Therapies in a Veteran Population

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Background
Incretin therapies, comprised of the dipeptidyl peptidase-4 inhibitors (DPP-4i) and glucagon-like peptide-1 receptor agonists (GLP-1 RAs), have been increasingly utilized for the treatment of type 2 diabetes (T2DM). Since their introduction, multiple studies have indicated potential benefit of the incretin therapies for weight loss, renal and cardiac protection, further increasing utilization. As prescribing rates have increased, post-marketing case reports and observational studies have indicated a potential risk of pancreatitis associated with both the incretin therapies. However, other studies have shown no overall increased risk of pancreatitis with the incretin therapies. Regardless of what studies have shown, adverse event reporting systems such as the Food and Drug Administration Adverse Event Reporting System (FAERS) and Veterans Affairs (VA) Adverse Drug Event Reporting System (ADERS) indicate that incretin therapies are some of the most common drugs associated with reports of pancreatitis. Thiazolidinediones (TZDs) are another class of medications utilized as second-line agents for the treatment of T2DM, which have not been associated with pancreatitis through adverse event reporting systems or observational studies.

Objectives
This study aims to compare the relative risk of pancreatitis in veterans with T2DM prescribed an incretin therapy (DPP-4i or GLP-1 RA) versus TZDs (pioglitazone and rosiglitazone) within the Veterans Health Administration (VHA).

Methods
This is a retrospective cohort study analyzing the incidence of pancreatitis in veterans with T2DM prescribed an incretin therapy versus a TZD. Veterans with T2DM first prescribed an incretin therapy or a TZD between January 1, 2011 and December 31, 2021 were identified and placed into two cohorts. A diagnosis of pancreatitis within 1 year of being prescribed an incretin therapy or TZD was counted as a positive case. Data was collected and analyzed utilizing informatics and compounding Infrastructure (VINCI). Secondary outcomes include number of hospitalizations and/or emergency room visits due to pancreatitis, and mortality.

Learning Objectives:
Describe drug-induced pancreatitis
Identify potential mechanisms of incretin-based pancreatitis
Self Assessment Questions:
Which of the following is NOT a potential mechanism of drug-induced pancreatitis (DIP)?
A. Drug-induced hypertriglyceridemia
B. Pancreatic duct constriction
C. Drug-induced hyperkalemia
D. Accumulation of toxic metabolites
Which of the following best describes the potential mechanism related to incretin-based pancreatitis?
A. Increased insulin resistance
B. Stimulation of GLP-1 receptors leading to overgrowth of exocrine duct cells in the pancreas
C. Alpha-cell stimulation leading to suppressed glucagon release
D. Increased incidence of kidney stones
Q1 Answer: C Q2 Answer: B

Economic Impact of Clinical Interventions made by a Remote Clinical Pharmacist within a Regional Ambulatory Oncology Network
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Purpose: The recent COVID-19 pandemic has caused many industries to evaluate the necessity of in-person, and shift to remote work. However, healthcare has been slow to adopt this into practice. The ambulatory setting provides a unique opportunity for remote patient care via telehealth. In this setting, clinical oncology pharmacists optimize patient care by ensuring appropriate medication therapy, helping to prevent/minimize adverse effects, and identifying drug-drug interactions. There is limited data showing the benefit of a remote clinical oncology pharmacist. This study strives to evaluate the economic impact of a remote board-certified oncology pharmacist (BCOP).
Methods: This was a multi-center, retrospective chart review conducted at Munson Healthcareâ€™s seven regional ambulatory infusion centers. This study was approved by the Munson Healthcare Institutional Review Board. Patients included received chemotherapy, immunotherapy, or non-chemotherapy infusions with orders needing to be reviewed by a pharmacist. The primary outcome was to determine the total cost and return on investment based on cost savings and cost avoidance clinical interventions made by a full-time remote BCOP. Secondary outcomes included total number of clinical interventions, intervention category, interventions by diagnosis and regimen and interventions accepted by providers. Clinical interventions were discussed every 2 weeks by an Intervention Evaluation Committee to classify each intervention.
Results: Data collection ongoing. Full results and conclusions will be presented at Great Lakes Pharmacy Resident Conference.
Learning Objectives:
Explain 1.Explain the value of a remote BCOP in a regional ambulatory infusion center.
Describe 2.Describe the clinical interventions a remote BCOP can make to improve patient care.

Self Assessment Questions:

1. Which of the following are benefits of a remote BCOP in regional ambulatory infusion centers?
   A. To facilitate clinical review by a BCOP at regional sites without a dedicated specialist
   B. To optimize the care of the patients
   C. To reduce healthcare costs associated with patient care
   D. All the above
2. Which of the following is an example of a remote BCOP improving patient care?
   A. Respond to a patient who is having an acute allergic reaction to an oxaliplatin infusion.
   B. Contacting a doctor to optimize a patientâ€™s antiemetic regimen who experienced nausea/vomiting with their previous cycle of chemotherapy.
   C. Recommend reducing a dose of a medication (if it is within an acceptable range) to save the cost of wasting a partial amount of a chemotherapy
   D. Both B and C

Q1 Answer: D Q2 Answer: D

The Incidence of Hyperfibrinolysis and Mortality Difference in Patients Who Receive Massive Transfusion Treatment With or Without Tranexamic Acid Administration

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Purpose: For patients with traumatic injuries presenting with life-threatening bleeding, massive transfusion protocol (MTP) is the first-line approach to rapidly replacing blood using blood products. Consensus guidelines recommend tranexamic acid (TXA), an antifibrinolytic agent, as an empiric adjunctive therapy, although the available data is still inconclusive if TXA provides a benefit. The purpose of this study is to characterize the incidence of hyperfibrinolysis in trauma patients receiving MTP and determine if there is a mortality difference in patients with hyperfibrinolysis who receive MTP with or without TXA administration.â€¯

Methods: This was a retrospective, single-center, cohort study of trauma patients requiring MTP from January 1st, 2016 - June 30th, 2022.â€¯â€¯Patients were included if age â‰¥ 18 years and received MTP. The primary outcome was 30-day mortality. Secondary endpoints included 30-day mortality, hospital length of stay, intensive care unit length of stay, amount of blood product received in MTP, time to hemodynamic stability, and vasopressor requirements. Results were compared based on the student t-test for normal distribution and the Mann-Whitney U test for non-parametric distribution. Categorical data was assessed using chi-square. A multivariate logistic regression was used to determine if there was a difference between TXA administration and mortality.

Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Review the available evidence regarding tranexamic acid use in trauma patients
Define massive transfusion protocol

Self Assessment Questions:

According to the CRASH II trial, what was the window of time, from trauma to administration, when TXA showed benefit?
   A. Within 1 hour
   B. 1-2 hours
   C. Within 3 hours
   D. 4-5 hours

What component(s) of ROTEM are used to determine hyperfibrinolysis on ROTEM?
   A. INTEM
   B. EXTEM
   C. FIBTEM
   D. B & C

Q1 Answer: C Q2 Answer: D

Comparison of Safety Outcomes Between Weight-Based and Fixed-Dose Prednisone Taper Dosing Strategies After Kidney Transplant

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The purpose of this study is to compare the safety and efficacy of weight-based (WB) and fixed-dose (FD) prednisone (PRED) after kidney transplant (KTx). This was a retrospective cohort study of patients receiving WB versus FD PRED tapers after KTx. Data were collected using retrospective chart review of patients receiving an isolated kidney transplant between June 2018 and July 2020. A change in institutional protocol occurred in July 2019, when prednisone dosing after KTx changed from WB (1mg/kg/day day 1, 0.5mg/kg/day day 2-3, 0.25mgkd/day day 4-5, then off; doses based on ideal body weight) to FD (35mg twice daily, 35mg daily, 20mg daily day 4-5, then off). Eligible patients included adult KTx recipients who received a prednisone taper according to the institutional protocol. Patients were excluded if they received steroids beyond the end of the standard taper. The primary outcome was a composite incidence of either initiation of an insulin infusion or two or more blood glucose readings greater than 200 mg/dL from the time of transplant to discharge or post-op day 6. The primary outcome was compared using a chi-square test with a significance level of alpha less than 0.05. A total of 347 patients were included in the study, with 184 in the WB group and 163 in the FD group. Patients in the FD group had a greater average total prednisone exposure (152.7 mg vs 174.2 mg, p<0.001). No statistical differences were seen between groups for the primary composite outcome (78 (56.6%) vs 60 (43.5%); p=0.289), incidence of insulin infusion (138 (52.1%) vs 127 (47.9%); p=0.524), or two or more blood glucose readings >200 mg/dL (78 (56.6%) vs 60 (43.5%); p=0.289). The results of this study suggest there is no difference in glycemic outcomes between fixed-dose and weight-based prednisone withdrawal strategies during the transplant admission.

Learning Objectives:

Recognize the most likely adverse effects of high-dose steroids

Report differences in the effects of weight-based and fixed-dose steroid taper strategies on safety outcomes in kidney transplant recipients

Self Assessment Questions:

1. Which of the following is NOT a common adverse effect associated with corticosteroids?
   A. Hyperlipidemia
   B. Bradycardia
   C. Glucose intolerance
   D. Increased risk of infection
2. Based on this study, which of the following statements best describes the differences in glycemic outcomes between the weight-based and fixed-dose steroid taper?
   A. The weight-based regimen was associated with an increase in hyperglycemia compared to the fixed-dose regimen
   B. The fixed-dose regimen was associated with an increase in hyperglycemia compared to the weight-based regimen
   C. There was no difference in hyperglycemia between the two dosing regimens
   D. The weight-based regimen was associated with increased incidence of the composite outcome but not the incidence of blood glucose levels >200 mg/dL

Q1 Answer: B Q2 Answer: C

Cryoprecipitate Alone Compared to Cryoprecipitate plus Tranexamic Acid for Hemorrhagic Transformation after Intravenous Alteplase in Acute Ischemic Stroke

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Purpose: Intravenous (IV) thrombolytics are a mainstay of initial treatment for acute cardioembolic and atherosclerotic stroke patients. With these agents, there is a risk of intracranial hemorrhagic transformation. Current guidelines from the American Heart Association/American Stroke Association (AHA/ASA) recommend that patients treated with intravenous alteplase experiencing intracranial hemorrhage (ICH) should receive a reversal agent such as cryoprecipitate, tranexamic acid (TXA), or aminocaproic acid. These are classified as â€œweakâ€ recommendations and are based on expert opinion, rather than high-quality evidence. At Bronson Healthcare Group, these patients have historically been treated with either cryoprecipitate alone or cryoprecipitate plus IV TXA. With the lack of quality evidence available and the poor outcomes associated with ICH post-alteplase administration, more information is needed regarding proper management of these cases. The objective of this study is to compare the efficacy and safety of cryoprecipitate alone versus cryoprecipitate plus tranexamic acid when treating intracranial hemorrhagic conversion in patients who received IV alteplase for acute ischemic stroke.

Methods: This is a retrospective chart review which includes patients who were treated with either cryoprecipitate alone or cryoprecipitate plus tranexamic acid for intracranial hemorrhage after receiving IV alteplase for ischemic stroke at Bronson Healthcare Group. The primary outcome will compare the combined rate of in-hospital mortality and palliative discharge. Patients with intracranial hemorrhage after alteplase administration were divided into two cohortsâ€”patients who received cryoprecipitate alone and patients who received both cryoprecipitate and tranexamic acid.

Results/conclusion: Data analysis is currently being performed. Results and conclusions will be presented at the 2023 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recall the recommended treatments for hemorrhagic conversion after receiving tPA by the American Heart Association/American Stroke Association

State the reasons why some providers might use tranexamic acid over cryoprecipitate

Self Assessment Questions:

What is one of the recommended initial treatments for symptomatic intracranial hemorrhage after receiving IV alteplase for acute ischemic stroke, per the American Heart Association/American Stroke Association?
A. Aminocaproic acid + tranexamic acid
B. Tranexamic acid + prothrombin complex concentrates
C. Cryoprecipitate
D. Packed red blood cells
Compared to cryoprecipitate, what is one of the potential benefits of using tranexamic acid for intracranial hemorrhagic transformation after receiving IV alteplase for acute ischemic stroke?
A. Less side effects
B. Less time to prepare
C. More effective
D. More robust evidence to support its use
Q1 Answer: C Q2 Answer: B

Evaluation of the Safety and Efficacy of Tenecteplase versus Alteplase for Treatment of Acute Ischemic Stroke in a Community Hospital Setting

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Purpose
Alteplase has been the standard of care for acute ischemic stroke (AIS). However, recent studies show promise for a newer agent, tenecteplase. Tenecteplase is a genetically modified recombinant tissue plasminogen activator approved for myocardial infarction. Tenecteplase has greater fibrin specificity, reduced plasminogen activator inhibitor-1 binding and longer half-life compared to alteplase, allowing for decreased bleeding risk, more rapid coronary patency, and decreased administration time. Given these advantages, we evaluated the safety and efficacy of tenecteplase versus alteplase within the local community hospital.

Methods
In this retrospective study, data was collected for patients with a diagnosis of AIS presenting to the emergency department within 4.5 hours of symptom onset. Treatments were alteplase 0.9 mg/kg (max 90 mg) or tenecteplase 0.25 mg/kg (max 25 mg). Data was collected from May 2021 to October 2022. The primary endpoint was the change in the National Institutes of Health Stroke Scale (NIHSS) score from baseline to 24 hours. The secondary efficacy endpoint was major neurologic improvement defined by a decrease in NIHSS of 8 or more. Secondary safety endpoints included any hemorrhage at 24-48 hours and death due to any cause within 30 days.

Results
This study included 87 patients: 57 receiving alteplase and 30 receiving tenecteplase. No differences in baseline demographics were found. Efficacy outcomes favored tenecteplase numerically but not statistically given an underpowered study. Tenecteplase had a numerically larger change in the primary outcome compared to alteplase [4.6 vs 3.39 (p=0.498)] and a higher incidence of major neurologic improvement with 26.7% of patients with a reduction of 8 or more in NIHSS score compared to 22.8% of alteplase patients (p=0.689). Secondary safety outcomes were similar across groups.

Conclusion
A larger study is needed to determine superiority in outcomes. With this data and administration ease, tenecteplase is an appropriate option for AIS treatment.

Learning Objectives:
Describe the advantages and disadvantages of using tenecteplase versus alteplase for the treatment of acute ischemic stroke
Discuss current evidence regarding tenecteplase for the treatment of acute ischemic stroke

Self Assessment Questions:
Which of the following is an advantage of tenecteplase versus alteplase for the treatment of acute ischemic stroke?
A. Greater fibrin specificity
B. Increased binding to PAI-1
C. Shorter half-life
D. Higher price
Which subpopulation of stroke patients has tenecteplase shown superiority?
A. Small vessel occlusion

B. Large vessel occlusion
C. Stroke of other determined etiology
D. Tenecteplase has not shown superiority in any subpopulation
Q1 Answer: A Q2 Answer: B

Tumor Lysis Syndrome in Patients with Acute Myeloid Leukemia Treated with Venetoclax and Hypomethylating Agents without Dose Ramp-up

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tolerate intensive chemotherapy. Venetoclax has been associated with fatal episodes of tumor lysis syndrome (TLS) in early chronic lymphocytic leukemia (CLL) trials. Thus, the prescribing information for venetoclax recommends a gradual dose increase schedule for patients with CLL, and AML. There are limited data evaluating the safety of full-dose venetoclax without a dose ramp-up in patients with AML. At the study site, a dose ramp up is not used and concomitant strong CYP3A4 inhibitors are not avoided when treating patients with AML with venetoclax.
Aim: Describe the incidence of laboratory and clinical TLS in patients with AML after administration of HMA+venetoclax vs HMA, when venetoclax is initiated without a dose ramp-up.
Methods: A retrospective cohort analysis of adult patients with AML treated with HMA+venetoclax or HMA alone from 6/30/2014-8/22/2022 at an academic medical center will be conducted. Patients will be divided into two comparator groups based on AML treatment, of either HMA+venetoclax or HMA alone. The primary endpoint will be the incidence of laboratory and/or clinical TLS by day 10. Secondary endpoints will include rates of laboratory TLS, clinical TLS and risk factors for development of laboratory/clinical TLS. A multivariate logistic regression will be utilized to assess for the correlation between the chosen covariates and primary endpoint. Covariates will be selected based on factors that impact TLS based on prior studies.
Results: We hypothesize no difference in laboratory/clinical TLS incidence between HMA+venetoclax vs HMA, when venetoclax is initiated without a dose ramp-up.
Conclusion: There are minimal data describing the safety of venetoclax without a dose ramp-up in patients with AML. Given this deviation from standard of care, it is critical to share this information to demonstrate the safety of this approach.

Learning Objectives:
Describe the role of venetoclax and hypomethylating agents (HMAs) in acute myeloid leukemia (AML)
Identify gaps in literature regarding fixed-dose regimens of venetoclax in AML
Self Assessment Questions:
Which of the following is true regarding venetoclax drug-drug interactions:
A. No interactions exist
B. Interacting medications must be held during venetoclax initiation
C. Venetoclax is a CYP3a substrate
D. Venetoclax is a CYP2c9 substrate
What is the rationale for venetoclax dose ramp-up in AML?
A. Reduction of TLS (theoretical)
B. Test dosing for hypersensitivity
C. No reason
D. Allows for concomitant use of CYP3a4 inhibitors (such as azoles)
Q1 Answer: C Q2 Answer: A

Long-Term Assessment of Weight Loss Medications in a Veteran Population

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Purpose
The purpose of this study was to evaluate the effectiveness of current weight loss medications utilized at Veteran Health Indiana (VHI). This study aimed to grow upon the Hood et al study that was conducted at VHI and published in 2021 by increasing the timeframe from 12 to 48 months. The primary endpoints are percentage of body weight lost and total weight lost during the study period on each weight loss medication at months 3, 6, 12, 24, 36, and 48. Several secondary endpoints will be used to help determine efficacy of the current weight loss medications as well.

Methods
This study was a retrospective analysis utilizing VHI electronic health record to perform chart review of patients prescribed weight loss medications at VHI. Patients evaluated for inclusion required an active weight loss medication prescription between 6/1/17 and 7/31/21 and met criteria consisting of: at least 18 years of age; prescription for phentermine/topiramate, phentermine, orlistat, liraglutide, or naltrexone/bupropion; on the weight loss medication for at least six months during the trial period. Patients were identified through medical records. A report of 235 patients was generated and screened for inclusion criteria, with ~54% of the patients meeting exclusion criteria and 105 patients were included for data collection. Data collected included: age; sex; race; height; weight, body mass index, and A1c at 3, 6, 12, 24, 36, and 48 months; body mass index categories at initiation and conclusion; comorbidities; history of bariatric surgery; medication prescribed for weight loss; maintenance dose of medication; duration on the medication during study period; reason for medication discontinuation; patient enrollment in lifestyle class and duration enrolled; and concomitant use of medications that may increase weight from the VA/DoD Guidelines.

Results and Conclusions
Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:
Identify Patients who may be able to benefit from weight loss medications in addition to lifestyle changes based on specific factors.
Discuss Major reasons for weight loss medication discontinuation.

Self Assessment Questions:
Which one of these patients may benefit from starting a weight loss medication based on VA criteria for use?
A. A 56-year-old female with diabetes whose BMI is 24
B. A 30-year-old male whose BMI is 41 and has never tried weight loss medications
C. A 42-year-old male whose BMI is 36 and is currently enrolled in the MOVE program
D. A 60-year-old female whose BMI is 36 and is not currently enrolled in the MOVE program
GLP-1 agonists were first originally FDA-approved for which indication?
A. Type 1 Diabetes Mellitus
B. Type 2 Diabetes Mellitus
C. Weight Loss, Chronic
D. Heart Failure
Q1 Answer: C Q2 Answer: B

Utilization of Dispense Tracking to Reduce Re-dispensing

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lacking on its impact on smaller institutions. This project aims to assess the utility of implementing a dispense tracking system in a 300-bed hospital by evaluating whether the system decreases costs, re-dispensed medications, and medication messages between nurses and pharmacy staff for lost medications.

Methods: The study design was a retrospective; pre-post tracking implementation conducted at Riverside Medical Center. Pre-implementation data was collected from May 2021 to March 2022, with a washout period in April 2022 for dispense tracking implementation. The collection of post-implementation data was from May 2022 to March 2023. The primary endpoint was a change in the number of lost medications. Secondary endpoints included number of medication messages for lost medications and expenses associated with re-dispensing medications.

Results: Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:
Discuss the efficacy of dispense tracking software on a small rural hospital
Identify barriers to dispense tracking utilization

Self Assessment Questions:
Which area did not have a statistically significant change from this study
A. Cost of missing medications
B. Number of missing medications
C. Number of medication messages

D. Number of medication errors
What barriers are seen for pharmacist not scanning medications
A. Not enough time
B. Medication is needed urgently
C. Forgetting to Scan
D. All of the above
Q1 Answer: A Q2 Answer: D

Development and Implementation of the Proton Pump Inhibitor Deprescribing Delegation Protocol and Clinical Decision Support Workflows

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Purpose: This project aims to create a proton pump inhibitor (PPI) deprescribing delegation protocol and clinical decision support workflows for implementation in the primary care setting. This protocol will allow pharmacists to deprescribe PPIâ€™s and guide providers to optimize gastric acid reducing therapy in routine workflows. Additionally, a deprescribing pathway and improvements to refill request criteria will be built in the electronic health record to assist with prescribing.

Methods: Literature review was completed to develop a disease state exclusion list identifying patients ineligible for deprescribing. Those with recent PPI dose increases due to lack of symptom control and those who failed other acid reducing therapy such as histamine 2 receptor antagonists (H2RA) or other over the counter therapy were deemed ineligible. Patients eligible for retrospective chart review were adults 18 years or older who were prescribed a PPI between June 1, 2022 to August 31, 2022. Patients were randomized for chart review and assessed for PPI deprescribing eligibility. For each eligible patient, deprescribing actions such as dose/frequency reduction, H2RA switch, as needed antacid switch, or non-pharmacologic therapy were assigned. These actions will be included in the protocol as appropriate therapy modifications made by the pharmacist.

Results: A total of 57% of patients were found to be eligible for deprescribing. There were 14 patients on PPI therapy with an unspecified indication for long-term use. For the assigned deprescribing actions, majority of patients (41%) would benefit from a switch to other acid reducing therapy. A total of 10 patients were eligible for PPI dose reduction or frequency of administration while 6 patients could discontinue therapy and pursue non-pharmacologic interventions. The most common adverse event which occurred in 8% of patients was the occurrence of fractures after a fall.

Conclusion: Final results will be presented at the 2023 Great Lakes Pharmacy Residency Conference.

Learning Objectives:
Identify various therapy modifications to be made when deprescribing PPIâ€™s
Recognize patients who are eligible for PPI deprescribing
Self Assessment Questions:
Which of the following are appropriate actions to take when deprescribing PPI therapy?
A. PPI dose reduction
B. Switch to H2RA
C. Discontinue therapy and pursue non-pharmacologic intervention
D. All of the above
Which of the following indications for therapy would be eligible for deprescribing?
A. Barrettâ€™s esophagus
B. NSAID prophylaxis with history of GI bleed
C. Unspecified epigastric pain
D. Esophageal strictures
Q1 Answer: D Q2 Answer: C

Belatacept in Pancreas Transplantation: Single Center Experience

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toxicities associated with calcineurin inhibitors. In kidney transplantation, belatacept is associated with reduced emergence of donor specific antibodies (DSA).
Methods: We describe outcomes of seven pancreas transplant recipients that were converted to belatacept while on immunosuppression with calcineurin inhibitor, mycophenolate +/- prednisone and had at least 6-months of follow up. Belatacept was started at 10 mg/kg IVPB on day 1 and day 5, week 2, week 4, week 8 and week 12; and continued at 5 mg/kg IVPB every 4 weeks thereafter. Calcineurin inhibitor was tapered and discontinued 3 months post-belatacept initiation. Patients were continued on mycophenolate and prednisone 10 mg daily was added if not already prescribed.
Results: There were 7 adult pancreas transplant recipients; 6 simultaneous pancreas kidney transplants and 1 pancreas after kidney transplant. Three patients (43%) were at high immunologic risk for rejection (Peak PRA > 20%). All received Thymoglobulin induction. Median time to conversion was 2 months. Four patients (57%) were converted for rejection while 3 (43%) were converted for insulin requirements. Median Hgb A1C decreased from 6.1 % to 5.4% 6 months post-belatacept conversion. Four patients (57%) required insulin maintenance after conversion with one achieving insulin independence at 27 months. Median eGFR remained stable from 39.4 mL/min to 38.9 mL/min 6 months post-belatacept conversion. Two patients (29%) had an episode of rejection post-belatacept conversion and 3 patients (43%) developed de novo DSA.
Conclusion: Belatacept conversion stabilized kidney allograft function at 6 months but did not improve pancreas function. The difference in HgbA1C from pre-belatacept conversion to 6 months post-belatacept conversion is likely attributed to the optimization of insulin regimens as opposed to belatacept conversion. Further studies are warranted to assess the utility of belatacept in pancreas transplant recipients.
Learning Objectives:
Recognize the most common maintenance immunosuppression regimen used for pancreas transplantation.
Identify the current place in therapy for the use of belatacept in solid organ transplantation.
Self Assessment Questions:
What is the most common maintenance immunosuppression regimen used in pancreas transplant recipients?
A. Cyclosporine + mycophenolate + prednisone
B. Tacrolimus + mycophenolate + prednisone
C. Tacrolimus + mycophenolate
D. Everolimus + mycophenolate
Which of the following describe the current place in therapy for the use of belatacept in solid organ transplantation?
A. FDA approved for any solid organ transplant for maintenance immunosuppression
B. FDA approved for only kidney transplant recipients for induction
C. FDA approved for only kidney transplant recipients for maintenance immunosuppression
D. FDA approved for kidney and pancreas transplant recipients for maintenance immunosuppression
Q1 Answer: B Q2 Answer: C

Impact of Utilizing an HIV Pre-Exposure Prophylaxis (PrEP) Dashboard on Improving PrEP Enrollment in a Veteran Population
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Purpose: Approximately 1.2 million people in the United States have human immunodeficiency virus (HIV), however only an estimated 86% of those people are aware of their status. Pre-exposure prophylaxis (PrEP) is highly effective at reducing the risk of HIV acquisition and transmission in at-risk individuals such as those with high-risk sexual or injection drug use behaviors - however, only an estimated 18% of patients eligible for PrEP are receiving it. In an effort to increase PrEP prescribing, the Veterans Health Administration (VHA) created an HIV PrEP dashboard which identifies at-risk veterans, including those with recent sexually transmitted infections, men who have sex with men, and injection drug use. This dashboard was utilized by a team at the Lexington VA HealthCare System (VAHCS) in an initiative to increase PrEP enrollment. This analysis is designed to evaluate the effectiveness of this initiative and identify barriers to enrollment.

Methods: A pharmacist-led PrEP initiative began at the Lexington VAHCS in September 2022. Using the VHAâ€™s HIV PrEP dashboard to identify â€˜actionable patientsâ€™, the team performed chart review to confirm eligibility. Patients were ineligible if they had a diagnosis of HIV, a PrEP medication allergy, were already prescribed PrEP, had not established care at the local facility, or did not have a true risk factor. Three pharmacists reviewed the eligible patients to determine the best means of patient contact on a case-by-case basis, including a chart note alerting providers, personally contacting providers, or a direct call to the patient in collaboration with primary care or infectious diseases providers. The primary objective was the number of additional patients enrolled in PrEP during this time. Secondary objectives included the accuracy of the HIV PrEP dashboard in predicting eligible patients, barriers to PrEP enrollment, and the most effective strategies to target patient PrEP enrollment.

Results/Conclusions: In Process.

Learning Objectives:
Define individuals eligible for pre-exposure prophylaxis (PrEP) and options of treatment.
Review the update of the 2021 CDC Pre-exposure Prophylaxis (PrEP) for the Prevention of HIV Infection in the United States Guidelines.

Self Assessment Questions:

Based on the 2021 CDC Pre-exposure Prophylaxis (PrEP) for the Prevention of HIV Infection in the United States Guidelines, which of the following patients would be eligible for PrEP treatment?

A. A man who has sex with men (MSM) and a chlamydia diagnosis 1 week ago
B. A man with a sexually transmitted infection 2 years ago
C. A man who injected drugs 10 years ago
D. A man in a monogamous relationship with 1 female partner without HIV

Which is not a pre-exposure prophylaxis (PrEP) treatment?

A. Tenofovir disoproxil/Emtricitabine (Truvada)
B. Tenofovir alafenamide/Emtricitabine/Bictegravir (Biktarvy)
C. Tenofovir alafenamide/Emtricitabine (Descovy)
D. Cabotegravir (Apretude)

Q1 Answer: A Q2 Answer: B

Predictors of Bleeding with Rotational Thromboelastometry in Patients with a Left Ventricular Assist Device

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Purpose:

Bleeding events are one of the most common complications associated with the management of left ventricular assist devices (LVAD) and are a significant source of morbidity and mortality in patients with LVADs. Rotational thromboelastometry (ROTEM) is a form of viscoelastographic testing that provides a real-time analysis of clot initiation, clot strength, and fibrinolysis. There is limited data regarding the use of ROTEM in predicting bleeding events in patients with LVADs post-implantation. Therefore, the purpose of this study is to determine if any component in ROTEM is predictive of bleeding events in LVAD patients to help prevent adverse events in these patients.

Methods:

This was a retrospective, single-centered, cohort study of LVAD patients implanted between January 2013 to December 2022 that compared ROTEM values between patients admitted due to bleeding versus non-bleeding controls. Using INTERMACS definition of bleeding, a bleeding event will be defined as an episode of suspected or external bleeding resulting in at least one of the following: death, procedure, or transfusion of any amount of red blood cells if more than 7 days post implant. ROTEM values drawn within 24 hours of hospitalization were included. Patients were excluded for the following reasons: ROTEM drawn after receiving blood or anticoagulant reversal agent, parenteral anticoagulation, or direct oral anticoagulants, and admission related to thrombotic events, index implantation, or device exchange. The primary outcome was to determine if any ROTEM values were predictive of bleeding events in patients with LVADs.

Results/Conclusions:

Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify causes of increased risk of gastrointestinal bleeding in patients with LVADs
Recognize the potential role of ROTEM in determining coagulopathy and bleeding risk in patients with LVADs

Self Assessment Questions:

Which of the following mechanismâ€™s describes why patients with LVADs are at a higher risk of gastrointestinal bleeding?

A. Acquired Von Willebrand disease
B. Lifelong anticoagulation
C. Arteriovenous malformation
D. All of the above

What is the potential role of point of care ROTEM monitoring in patients with LVADs?

A. Real-time qualitative assessment of coagulation status and coagulopathies in patients
B. Assessment of patient platelet function over the past 3 weeks
C. Provides quantitative data only to evaluate coagulation status
D. Assessment of LVAD functionality

Q1 Answer: D Q2 Answer: A

Management of Hyperglycemia and Hypertension in Patients with Hematologic Malignancy

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Each year, 180,000 patients are diagnosed with a hematologic malignancy in the United States. While life expectancy varies between hematologic malignancies, treatment advancements have improved prognosis to years rather than months for patients with acute lymphocytic leukemia (ALL), chronic lymphocytic leukemia (CLL), chronic myeloid leukemia (CML), and multiple myeloma (MM). These malignancies have a median age of diagnosis between 65-70 years old, and in this age group, there is a high prevalence of comorbidities including hypertension and diabetes that could be worsened by common cancer therapies. Poor outcomes may result if comorbidity management is deferred due to the urgency of cancer treatment. This study aims to identify the incidence of new or worsening hyperglycemia and hypertension in patients with hematologic malignancy and assess the appropriateness of comorbidity management. This single-center, retrospective, descriptive study has been approved by our Institutional Review Board. Adult patients with ALL, CLL, CML, or MM who initiated cancer treatment between January 1, 2021 and December 31, 2021 will be evaluated and followed through December 31, 2022. Demographics, baseline comorbidity data, malignancy etiology and treatment, and data related to the management and control of hyperglycemia and hypertension will be collected. The appropriateness of hyperglycemia and hypertension management will be assessed utilizing algorithms based on national practice guidelines and allow for consideration of hematologic disease related factors. The primary endpoint is the composite incidence of new hyperglycemia, diabetes, or hypertension and worsening of existing diabetes or hypertension. Secondary endpoints include incidence of individual composite endpoints, quantity and type of referrals placed to manage comorbidities, appropriateness of comorbidity management, number of unplanned healthcare encounters due to uncontrolled comorbidities, and the proportion of patients requiring cancer treatment dose reductions or delays due to uncontrolled comorbidities.

Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss the need for appropriate management of comorbidities in patients with hematologic malignancy
Describe the incidence of new or worsening comorbidities following treatment initiation for patients with hematologic malignancy

Self Assessment Questions:

Which of the following are reasons for comorbidity changes when a patient begins treatment for hematologic disease?
A. Cancer therapies (steroids, tyrosine kinase inhibitors, etc.)
B. Increase in patient frailty and advancing age
C. Increase in blood transfusions
D. Both A and B

What is a consideration for evaluating control of hyperglycemia in a patient with hematologic malignancy?
A. Patient weight fluctuations
B. Decreased contact with the healthcare system
C. Frequent blood transfusions
D. Anthracycline use causing hyperglycemia

Q1 Answer: D Q2 Answer: C

Answering the Burning Question: Calcium Chloride versus Gluconate for Hyperkalemia

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cardiac dysrhythmias, which are largely managed within emergency departments. Intravenous calcium is essential for acute symptomatic hyperkalemia management. In 1964, calcium chloride (CaCl) or calcium gluconate (CaGl) were first suggested in case reports, for cardiac membrane stabilization. Recent literature is sparce; limited to animal studies, few human studies, and extravasation case reports. Although studies have not been designed to quantify comparable risks among the two salts in hyperkalemia, CaGl is predominately used over CaCl. This literature gap is more evident, due to persistent drug shortages including calcium. A comparative evaluation of safety and efficacy between the two calcium salt formulations is needed.

This is an IRB approved, retrospective, single center, descriptive study, focusing on the safety and efficacy outcomes related to IV CaCl and IV CaGl. Patients included in this study comprised of adult patients in UIH emergency department that received IV CaCl or IV CaGl for serum potassium greater than or equal to 6.5mEq/L, that were not in cardiac arrest, between September 12, 2020 to November 30, 2022. Primary safety endpoint is incidence of injection site reactions after IV calcium salt administration. Primary efficacy endpoint is any change in EKG intervals. Secondary safety endpoints include hypercalcemia, changes in anion gap, changes in serum pH, and additional pharmacologic interventions for hyperkalemia. 126 patients were included in this study. 68 received IV calcium chloride and 58 received IV calcium gluconate. Statistical analysis will include chi square tests and fisher exact tests (for categorical data) and t test (for continuous data).

Learning Objectives:

Identify the safety and efficacy of IV calcium chloride and IV calcium gluconate
Explain the differences amongst IV calcium chloride and IV calcium gluconate

Self Assessment Questions:

Which calcium salt has a superior safety profile in the use of acute hyperkalemia?

A. IV Calcium Chloride
B. IV Calcium Gluconate
C. Neither - no difference!
D. Calcium carbonate

What is the elemental calcium conversion from IV calcium chloride:IV calcium gluconate

A. 0.0423611111111111
B. 0.000700231481481481
C. 0.0430555555555556
D. 0.04375

Q1 Answer: C Q2 Answer: D

Efficacy of Simulation Training on Medication Reconciliation Quality

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The purpose of this study is to evaluate the efficacy of simulated medication reconciliation training compared to traditional didactic training at a large pediatric academic medical center. The Joint Commission identifies medication reconciliation as a National Patient Safety goal, highlighting its importance in patient centered care. Additionally, the Agency for Healthcare Research and Quality states â€œThe goal of simulation-based training is to enable the accelerated development of expertise, both in individual and team skills, by bridging the gap between classroom training and real-world clinical experiences in a relatively risk-free environmentâ€This study is a pre/post quasi experimental study. Each month, pharmacy students participate in a one-hour didactic lecture covering medication reconciliation practices including how to properly enter a medication reconciliation encounter into an electronic medical record (EMR); each is assessed with a formal post-lecture assessment (Case 1). For this study, pharmacy students are randomized into two groups: didactic-only training arm and didactic plus simulation training arm which includes a unique assessment (Case 2). Case 2 includes a similar case scenario that assesses pharmacy students before (pre-brief) and after (debrief) a simulation. The intervention of this study is the simulation training. Participants in the didactic-only arm subsequently complete the simulation case for experience; however, only data collected from Case 1 contributes to their medication reconciliation accuracy score. The primary objective is measured by comparing the accuracy score from didactic-only training to the score of didactic plus simulation-based medication reconciliation. Data for evaluation of secondary objectives is gathered from the pharmacy studentâ€™s pre- and debrief questionnaire responses comparing the confidence level of the students before and after simulation-based training, using a survey with Likert scale questions.

Learning Objectives:

Define simulation-based training and describe how it can be used as an educational too.l for medication reconciliation training
Report on the most common medication reconciliation discrepancies when conducted by pharmacy trainees exposed to different training scenarios.

Self Assessment Questions:

Which of the following was assessed in the medication reconciliation simulation?

A. Students ability to obtain accurate medication reconciliation
B. Parents/caregivers understanding of a childâ€™s medications
C. Correct treatment dosage for treatment indication
D. Studentâ€™s confidence level obtaining medication history from external resources

Which of the following were identified discrepancies found in completed medication reconciliations?

A. Incorrect dose
B. Patient allergies and reactions not verified
C. Incorrect drug
D. All of the above

Q1 Answer: A Q2 Answer: D

Assessment of Gestational Diabetes Management in an Obstetrics and Gynecology Clinic for Collaborative Care

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The American College of Obstetricians and Gynecologists (ACOG) recognize that women with uncontrolled gestational diabetes (GDM) carry a risk of developing complications during pregnancy. The ACOG guidelines recommend insulin initiation for pharmacologic management of GDM. Because insulin management involves extensive education, monitoring, and frequent clinic visits providers may opt to delay the start of insulin by prescribing less preferred medications like metformin or glyburide. The purpose of this study is to determine the role a pharmacist would serve if integrated into collaborative practice at an OB-GYN clinic. In this single center, retrospective study the electronic medical record system was used to identify patients via ICD-10 code who were diagnosed with GDM from July 2021 to July 2022. Patients were included if they had an Indiana University Health OB-GYN provider and had trial and failure of non-pharmacologic GDM management. Patients who had prior diagnosis of GDM, Type 1 diabetes, or Type 2 diabetes were excluded. The primary endpoint was the number of patients who met blood glucose goals during the pregnancy and until birth. Secondary endpoints included the number of patients that were prescribed insulin as initial pharmacologic therapy, the number of patients that were prescribed other pharmacologic therapy, and the number of patients with complications during the pregnancy typically associated with GDM. There were 102 unique patients included with an average gestation of 28.4 weeks at the time of GDM diagnosis. Preliminary data reveals that metformin was the most common initial agent prescribed (44.1%) followed by glyburide (36.3%) and insulin (19.6%). Further data points to be analyzed include: fasting and post-prandial blood glucose readings; number of clinic visits related to GDM; and number of patients who had complications during pregnancy related to GDM defined as preterm delivery, cesarean delivery, and prolonged hospital stay postpartum.

Learning Objectives:

Recognize the risks to the female and fetus when metformin or glyburide are used to manage GDM

Indicate when it would be appropriate to consider pharmacologic therapy to manage GDM

Self Assessment Questions:

Insulin is the first line pharmacotherapy option for GDM because:

A. It is safe for the fetus

B. It is easily titratable

C. It is often the most cost effective

D. Both A&B

When would pharmacological therapy be considered for the management of GDM?

A. Before the patient has tried/failed dietary modifications

B. When over 10% of blood glucose values for 1 week are above target thresholds

C. When over 30% of blood glucose values for 1 week are above target thresholds

D. When over 50% of blood glucose values for 1 week are above target thresholds

Q1 Answer: D Q2 Answer: C

Analysis of Healthcare Utilization, Cost, and Clinical Outcomes among Members with Asthma: Integrated versus Non-Integrated Benefit Design

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benefit design that employer groups can select when evaluating coverage options for their employees. Conversely, non-integrated benefit design (carve-out) means that the health plan only administers the medical benefit. The value of integration has been shown across studies and can result in increased quality of care for members. Asthma affects 25 million Americans, contributing to estimated annual medical costs in 2015 of $49.9 billion. Asthma medications may be covered under pharmacy, medical or both benefits. Therefore, asthma is a suitable disease state to evaluate the impact of integrated benefit design. The objective of this study is to compare healthcare costs, utilization, and clinical outcomes between integrated and non-integrated pharmacy benefit designs among patients with asthma. This study will be valuable to evaluate real-world impact of integrated benefit design.

Methods: Retrospective, observational study of Blue Cross Blue Shield of Michigan (BCBSM) medical and pharmacy claims data. For inclusion, members must have active coverage in 2019 (index date), with one-year look back for at least one ICD-10 code for asthma. Members must be continuously enrolled 12-24 months post-index date. Members will be excluded if change in benefit design (HMO to PPO) or change in pharmacy formulary type. Integrated group includes members with BCBSM medical and pharmacy benefits and will be compared to non-integrated group (members with BCBSM medical benefit only). Primary outcome includes all-cause and asthma-specific cost and healthcare resource utilization with respect to prescription claims, inpatient visits, outpatient visits and emergency room visits. Secondary outcome includes annualized asthma exacerbation rate.

Learning Objectives:

Recognize the differences between integrated and non-integrated benefit design

Identify types of benefit coverage for asthma medications

Self Assessment Questions:

Which of the following is an accurate plan benefit/medication administration method pairing?

A. Medical Benefit/Self-Administered

B. Medical Benefit/Physician Administered or Self-Administered

C. Pharmacy Benefit/Physician Administered
D. Pharmacy Benefit/Self-Administered
Which of the following asthma medications is most likely to be covered under the medical benefit?
A. ProAir HFA (albuterol HFA) inhaler
B. Dupixent (dupilumab) injection
C. Singulair (montelukast) tablet
D. Cinqair (reslizumab) infusion
Q1 Answer: D Q2 Answer: D

Heparin Infusion Intensity in Patients with Mechanical Mitral Valve Replacement

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Background: It is well established that patients with a mechanical mitral valve have an increased risk of thrombosis. Guidelines recommend life-long vitamin K antagonist (VKA) therapy with a higher international normalized ratio (INR) goal of 2.5 â€“ 3.5 to anticoagulate these patients. The goal of this study is to determine the optimal heparin infusion dosing for patients with a mechanical mitral valve replacement.

Methods: This is a retrospective, single-center, cohort study of patients 18 years of age or older with mechanical mitral valve admitted to Michigan Medicine from January 2014 to December 2021 maintained on a singular heparin infusion intensity for at least 48 hours. Patients will be analyzed based on the heparin intensity nomogram they were placed on. With lower intensity defined as an anti-Xa goal level between 0.2 - 0.5 units/ml and higher intensity anti-Xa goal level between 0.3 - 0.7 units/ml. The primary outcome of this study is a composite of all bleeding events (major bleeding, clinically significant non-major bleeding, and minor bleeding) between the two groups of patients. Secondary outcomes include: bleeding events as mentioned above (analyzed individually) and thrombotic events. Bleeding events are defined via ISTH bleeding definitions. Exclusion criteria include non-nomogram heparin infusions and patients within 30 days post valve implantation. Patients who met criteria on their first encounter will be included, all other encounters will be excluded.

Results: Results in progress â€“ anticipated date of completion of 02/15/2023.

Discussion: It is currently unknown if patients with a mechanical mitral valve would benefit from either the lower intensity heparin infusion or higher intensity heparin infusion during admission. Data is needed to establish appropriate dosing guidelines for these patients.

Learning Objectives:
Describe the challenges of heparin infusion intensity in patients with mechanical mitral valves
Explain risk with over anticoagulanting and under anticoagulating patients with mechanical mitral valve

Self Assessment Questions:
Why do mechanical mitral valves have increased risk of thrombosis compared to other valve positions?
A. Slower blood flow of the mitral position valve in cases of atrial fibrillation, atrial dilation, and low left ventricular output
B. Turbulent blood flow
C. Due to being a foreign object in the valve
D. A & B
The 2020 ACC/AHA Guidelines recommend what INR goal for patients with mechanical mitral valves?
A. 1.5 - 2.0
B. 2.0 - 3.0
C. 2.5 - 3.5
D. 3.0 -3.5
Q1 Answer: D Q2 Answer: C

An Analysis of Clinical Pharmacist Driven Interventions Utilizing the Veterans Affairs National Academic Detailing Services Alcohol Use Disorder Dashboard

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Background: Alcohol use is a risk factor for numerous medical and mental health conditions. The prevalence of alcohol use disorder (AUD) is high among the veteran population and the recent COVID-19 pandemic had a significant impact on increased alcohol consumption nationwide. The AUD dashboard, developed by the VA National Academic Detailing Services, serves to detect those who have reported unhealthy levels of alcohol use based upon recent AUDIT-C scores. Clinical pharmacists are able to utilize this data to identify patients who may benefit from outreach addressing their alcohol consumption.
Statement of Purpose: To evaluate the number of successful interventions completed by a pharmacy resident among veterans with an elevated AUDIT-C within 60 days of initial contact.
Methods: This is a multicenter, observational, retrospective, cohort study conducted at the Lexington Veterans Affairs Healthcare System (VAHS) and Tennessee Valley VAHS. Patients considered to be eligible for inclusion had obtained AUDIT-C score of 8 or higher. The primary objective of this study is to evaluate the number of successful interventions completed by a pharmacy resident among eligible patients within 60 days of initial contact. Initial patient contact occurred via phone between 7/1/2022 to 12/31/2022. A manual chart review was conducted to assess status of interventions for up to 60 days following initial contact. Type of possible outcomes include intervention completed, intervention not indicated, or intervention unsuccessful. Completion of a successful intervention was defined as performing a brief intervention, updated AUDIT-C performed, pharmacotherapy for alcohol use initiated, referral to a substance use disorder specialty care, linkage to alcohol detoxification services, and referral to general mental health care. Additional secondary objectives aim to further analyze the types of outcomes resulted from dashboard identification.
Results and conclusion will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Review appropriate identification and treatment of AUD
Discuss the potential impact of clinical pharmacist driven interventions in patients with AUD

Self Assessment Questions:

Which of the following medications is NOT recommended by the VA/DoD guidelines for the treatment of alcohol use disorder?
A. naltrexone
B. escitalopram
C. topiramate
D. gabapentin

As defined by the VA/DoD guidelines, patients with an AUDIT-C score of __ or higher are considered to be engaging in severe risk drinking and is recommended to initiate pharmacotherapy treatment options?
A. 6
B. 8
C. 10
D. 12

Q1 Answer: B Q2 Answer: B

Is There SPACE for Stewardship? HECK-YES! Antibiotic Use for Low-risk AmpC Enterobacterales

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AmpC beta-lactamases are resistance enzymes associated with development of ceftriaxone resistance on therapy, but the risk of AmpC derepression is not equal among Enterobacterales. Enterobacter cloacae, Klebsiella aerogenes, Citrobacter freundii, Hafnia alvei, and Yersinia enterocolitica (HECK-YES) carry a moderate-to-high risk of AmpC derepression. This risk is significantly lower or absent in Citrobacter koseri, Citrobacter amalonaticus, Citrobacter farmeri, Serratia marcescens, Morganella morganii, and Providencia spp. If susceptible, ceftriaxone is an acceptable treatment for low-risk organisms. The purpose of this study is to evaluate the impact of an AmpC stewardship intervention on optimal treatment of low-risk AmpC Enterobacterales.

This is an IRB approved, single pre-test, post-test quasi-experimental study conducted at a 5-hospital health system. An AmpC stewardship intervention was implemented July 2022, which included education, removal of a microbiology comment indicating potential for ceftriaxone resistance on therapy for low-risk AmpC organisms, and modification of a blood PCR comment for Serratia marcescens to recommend ceftriaxone. The study population includes adult patients pre- (July 2021-December 2021) and post-intervention (July 2022-December 2022) who received at least 72 hours of inpatient definitive therapy and had non-urine cultures growing low-risk AmpC Enterobacterales. Patients with organisms demonstrating ceftriaxone resistance, moderate-to-high risk of AmpC derepression, or limited data or unknown AmpC risk were excluded. The primary outcome is the proportion of patients receiving ceftriaxone definitive therapy. Secondary outcomes include treatment failure, in-hospital mortality, length of stay after index culture, and ceftriaxone-resistant organisms or Clostridioides difficile infection within 30 days. Treatment failure is a composite of in-hospital mortality, hospital readmission within 30 days, or retreatment for the same organism within 30 days. Outcomes will be assessed using bivariate analysis with Chi-square or Mann-Whitney-U tests, as appropriate. A multivariable logistic regression model will be used to identify variables independently associated with ceftriaxone use.

Results and conclusions will be presented at GLPRC

Learning Objectives:
Classify Enterobacterales species based on risk of AmpC derepression
Select an antibiotic regimen for both low-risk and moderate- to high-risk AmpC-harboring Enterobacterales
Self Assessment Questions:
Which of the following organisms is considered low risk of AmpC derepression?
A. Enterobacter cloacae
B. Citrobacter freundii
C. Klebsiella aerogenes
D. Citrobacter koseri
For which of the following organisms is ceftriaxone an acceptable definitive therapy option?
A. Citrobacter freundii
B. Serratia marcescens
C. Enterobacter cloacae
D. Hafnia alvei
Q1 Answer: D Q2 Answer: B

Comparative Efficacy and Cost Effectiveness of IV Iron Therapies in Ambulatory Pediatric Patients

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Statement of Purpose: Intravenous iron has become a widely used treatment modality in the pediatric population when oral iron supplementation is inadequate in resolving iron deficiency anemia. It is well established that intravenous iron use comes with risks such as anaphylaxis and infusion reactions, particularly with the use of iron dextran. Factors for consideration when selecting between products include infusion time, cost, side effect profile, compatibility with other infusions, and possibility of single, total-dose infusion. This study will aim to assess comparative efficacy and cost effectiveness between intravenous iron formulations in pediatric patients with iron deficiency anemia. To our knowledge, this will be the first comparative efficacy trial and cost-effectiveness analysis in a pediatric patient population.
Methods: This retrospective observational study includes pediatric patients aged 18 or younger with iron deficiency anemia who received an outpatient intravenous iron infusion at a Riley Hospital for Children outpatient infusion clinic from 5/1/2012-5/1/2022. Endpoints were compared among patients who received one of four formulations of intravenous iron â€“ iron sucrose, iron dextran, ferric carboxymaltose, or ferric gluconate. The primary endpoint assesses improvement of iron deficiency anemia, defined as average change in hemoglobin from baseline to weeks 4 and 12 after the patientâ€™s last infusion and compared between each of the four formulations of intravenous iron. Secondary endpoints evaluate the cost effectiveness of each intravenous iron formulation treatment regimen, number of patients requiring transfusion within 24 weeks of last IV iron dose, and improvement in iron status at 4- and 12-weeks post-infusion.
Results and Conclusions: Data collection is still ongoing. Results and conclusions will be presented at the 2023 Great Lakes Pharmacy Residency Conference.
Learning Objectives:
Describe the relative risk of anaphylaxis reactions between intravenous iron formulations based on existing data.

Identify those iron formulations which are more cost-effective than others based on cost-effectiveness analyses conducted in adult patients.

Self Assessment Questions:

Between the following intravenous iron formulations, which was shown to have the lowest risk of anaphylaxis reactions in adult data?

A. Sodium ferric gluconate complex
B. Iron dextran
C. Ferumoxytol
D. Iron sucrose

Which of the following iron formulations was found to be the most cost-effective when compared in adult studies?

A. Iron sucrose
B. Ferric derisomaltose
C. Ferric carboxymaltose
D. Oral iron supplementation

Q1 Answer: D Q2 Answer: C

Development of a Pharmacist-Driven Protocol for Outpatient Management of Hypercalcemia of Malignancy (HCM)

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Purpose: Hypercalcemia of malignancy (HCM) is associated with poor prognosis of disease and a high mortality rate. Treatment of HCM is based on severity of hypercalcemia and symptom assessment. The goals of treatment are to reduce serum calcium, increase calcium excretion, and decrease calcium absorption through reduced dietary intake. There are no professional guidelines on the treatment or management of HCM and the literature that is available surrounding HCM treatment does not provide guidance specifically for outpatient management. As a result, management varies among institutions and individual providers. The purpose of this process improvement project is to develop and investigate the potential impact of a pharmacist-driven protocol for outpatient management of HCM patients.

Methods: This process improvement project implements Plan-Do-Study-Act methodology. The â€œPlanâ€phase includes development of a new standard pharmacy service for assessment and optimization of HCM at outpatient Norton Cancer Institute (NCI) clinics. The â€œDoâ€phase applies the developed service retrospectively through chart review of a cohort of up to 50 patients diagnosed with HCM between January 1, 2021 and October 31, 2022 at any of the seven outpatient NCI clinics. The investigator evaluates pharmacist-driven HCM optimization opportunities and records HCM optimizations occurring without a standard pharmacist protocol in current state. To predict the potential impact of the protocol, the total number of HCM patients with potential optimization opportunities is compared to patients optimized in current state. In the â€œStudyâ€phase, results are analyzed to compare total patient optimizations, type of optimization opportunities, total optimization opportunities, and to quantify the potential financial impact of the protocol. Based on these results, revisions to the protocol are completed in the â€œActâ€phase to narrow applicability to patients with greatest benefit and to begin implementation of the protocol.

Results/Conclusions: To be presented at the 2023 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recognize patient outcome goals for optimizing treatment of hypercalcemia of malignancy
Select an appropriate treatment choice for hypercalcemia of malignancy based on patient factors

Self Assessment Questions:

What is a goal of treatment for outpatient management of HCM?

A. Increase serum calcium
B. Reduce bone metastases
C. Increase calcium excretion
D. Increase dietary calcium intake

A 62 year-old female presents to the outpatient clinic with nausea and vomiting. Her past medical history is significant for breast cancer with brain metastases. Her labs are significant for a serum calcium of 12.2 mg/dL, albumin of 2.9 g/dL, corrected calcium of 13.1 mg/dL, and SCr of 2.1. The patient has no previous history of hypercalcemia of malignancy, and no prior use of a bone modifying agent. Which of the following would be an appropriate treatment choice?

A. Oral hydration
B. Calcitonin
C. IV hydration and zoledronic acid
D. Furosemide

Q1 Answer: C Q2 Answer: C

Has IMPEDE-VTE SAVED lives? Evaluating the impact of VTE scoring tools in Multiple Myeloma

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Purpose: Patients with Multiple Myeloma (MM) are at high risk for developing venous thromboembolism (VTE). Historically, risk stratification and prophylaxis in this population have not been well-defined. With the recent publication of two new, independently-validated scoring tools, more clear recommendations for VTE prophylaxis have since been adopted in the National Comprehensive Cancer Network (NCCN) guidelines for Multiple Myeloma. The purpose of this study is to optimize the implementation of VTE prophylaxis in patients with MM. This study aims to characterize the adherence to NCCN guideline recommendations for VTE prophylaxis and to determine the impact of adherence to rates of VTE in this population.

Methods: This is a retrospective cohort study evaluating the incidence of VTE in patients with MM being initiated on first- or second-line systemic drug therapy. The primary outcome of VTE within 6 months of treatment initiation was assessed in two cohorts based on concordance with NCCN recommendations for VTE prophylaxis: concordant versus discordant. Secondary outcomes include time to onset of VTE, bleeding events or death from either cause.

Results/Conclusion: to be presented at Great Lakes Pharmacy Residency Conference.

Learning Objectives:
Recognize risk factors for VTE among cancer patients
Select appropriate VTE prophylaxis for a patient with multiple myeloma
Self Assessment Questions:
Which of the following drug therapies is a VTE risk factor common among patients with multiple myeloma?
A. CAR T-cell therapy (e.g. Carvykti)
B. Proteasome inhibitor (e.g. bortezomib)
C. Anti-CD28 monoclonal antibody (e.g. daratumumab)
D. Immunomodulatory imide drug (e.g. lenalidomide)
2. Which of the following is the most appropriate VTE prophylaxis for a patient with no pre-existing indication for anticoagulation that has an IMPEDE score of 2 and SAVED score of 1?
A. Warfarin (goal INR 2-3)
B. Aspirin 81 mg daily
C. Apixaban 2.5 mg daily
D. Enoxaparin 40 mg daily
Q1 Answer: D Q2 Answer: B

Cefazolin dose optimization protocol in PEK (P. Mirabilis, E. coli, and K. pneumoniae) bacteremia
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Purpose: Cefazolin is an effective treatment for patients with bacteremia caused by E. coli, K. pneumoniae, and P. Mirabilis (PEK). Currently, the CLSI breakpoint of â‰¤ 2 mcg/mL for PEK is considered susceptible for cefazolin. Local laboratory facilities identify a minimum cefazolin MIC of â‰¤ 4 mcg/mL. As a result, an alternative cefazolin dosing regimen has been proposed for patients requiring treatment for bloodstream infections caused by PEK organisms. The purpose of this study is to evaluate whether the proposed dosing regimen impacts clinical outcomes compared with conventionally dosed cefazolin in the treatment of patients with Enterobacterales (PEK) bacteremia.

Methods: This is a single center, retrospective, pre/post intervention study including adult patients admitted with PEK bacteremia and no resistance markers. Patients were included if appropriate empiric therapy was administered, and cefazolin was initiated for definitive therapy within 48 hours of bacteremia onset. The intervention was an implemented cefazolin dosing protocol based on available PK/PD data for cefazolin. The pre implementation cohort will include patients for which cefazolin was dosed conventionally between 1/1/2021 and 6/30/2022. The post intervention cohort includes patients who received dose optimized cefazolin per institutional protocol between 1/1/2022 and 6/30/2022. Patients were excluded if the bacteremia was polymicrobial, alternative bacteria isolated at the site of infection, combination therapy administered for definitive treatment, cefazolin not dosed per protocol, or bacteremia from a complicated source. The primary outcome is a composite treatment failure including escalation to broad spectrum antibiotics, breakthrough bacteremia with originally identified pathogen, need for ICU admission, or in hospital mortality while on antibiotics. Pertinent secondary outcomes will include microbiological response, duration of IV treatment, length of stay, adverse events, 30-day mortality, 30-day relapse of bacteremia, and 30-day readmission.

Results and Conclusion: Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:
Discuss existing literature surrounding cefazolin dosing at various MICâ€™s
Identify potential dosing optimization strategies for cefazolin in PEK (P. Mirabilis, E. coli, and K. pneumoniae) bacteremia
Self Assessment Questions:
What is the current cefazolin MIC breakpoint considered susceptible for P. Mirabilis, E. coli, and K. pneumoniae outside of the urinary tract per CLSI?

A. â‰¤ 1
B. â‰¤ 2
C. â‰¤ 4
D. â‰¤ 8
Which of these dose optimization strategies can be used to increase the probability of target attainment (PTA) of â‰¥60% time of free drug over the MIC for cefazolin?
A. Extending the infusion time from 30 minutes to 4 hours
B. Decreasing the dose from 2 grams to 1 gram
C. Giving a dose every 12 hours as opposed to every 8 hours
D. Giving cefazolin IV push throughout the treatment course
Q1 Answer: B Q2 Answer: A

Impact of a Pharmacy-driven Vaccination Intervention in Adult Warfarin Patients Managed in an Ambulatory Medication Management Clinic

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Purpose: Vaccine preventable diseases continue to affect adults throughout the United States despite adequate vaccinations available for prevention. The Center for Disease Control and Prevention (CDC) has created recommendations for vaccines based on age and medical conditions. However, many barriers exist that prevent patients from receiving all recommended vaccines. The objective of this study is to evaluate the impact of a pharmacy-driven vaccination intervention on vaccine rates in adult warfarin patients managed in an ambulatory clinic as compared to those managed in a cardiology office with no vaccine intervention.

Methods: This study is a retrospective chart review. Adults aged 19 years and older with warfarin managed by one of two clinics are being assessed for vaccination status based on CDC adult immunization recommendations. The intervention group consists of patients seen in the pharmacist-led ambulatory clinic for management of warfarin. These patients are evaluated for recommended vaccinations based on age, comorbidities, and previous vaccine history. Vaccination status is compared to the control group, which consists of patients taking warfarin and managed in a cardiology office that does not provide vaccine assessments as part of their standard of care. Patients referred to the clinic for management of disease states other than warfarin management or only recommended influenza or COVID-19 vaccinations are excluded. The primary outcome is the percent of patients who received all eligible vaccines compared between the intervention and control groups. Secondary endpoints include the percent of patients receiving at least one dose in every vaccine series recommended, the percent of patients receiving at least one vaccination, a pre-post evaluation of vaccination status in the intervention group, and the percent of vaccine regimens completed for each vaccine series.

Results & Conclusions: Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Review vaccine recommendations from the Centers for Disease Control and Prevention (CDC) Adult Immunization Schedule
Discuss how pharmacy-based interventions can improve vaccination rates in an ambulatory care setting

Self Assessment Questions:

Which vaccine does the Centers for Disease Control and Prevention (CDC) recommend in all adults â‰¥ 50 years old, in the absence of contraindications?
A. Hepatitis A vaccine
B. Zoster recombinant vaccine
C. Varicella vaccine
D. Measles, mumps, rubella vaccine
Which of the following pharmacy interventions have been shown in literature to be the most successful in increasing immunization rates?
A. Distributing leaflets and posters to patients
B. Standard care by immunization-trained pharmacists
C. Protocols involving intervention in routine care
D. Referring patients to primary care provider for vaccination
Q1 Answer: B Q2 Answer: C

Bupivacaine-meloxicam local instillation versus multimodal local analgesic cocktail for infiltration in total hip arthroplasty: a single-center retrospective cohort study

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pain syndromes, minimizing opioid use and opioid-related side effects, and development of chronic opioid use. The purpose of this study is to analyze pain control and the use of postoperative opioids in total hip arthroplasty (THA) patients that received bupivacaine-meloxicam local instillation compared to patients that received a multimodal local analgesic cocktail that consists of ropivacaine, ketorolac, epinephrine, and morphine or hydromorphone.
Methods: This is a single center, retrospective cohort study that will review patients who have had total hip arthroplasties from February 2022 through December 2022. The interventional cohort received bupivacaine-meloxicam while the control cohort received the multimodal local analgesic, consisting of ropivacaine, ketorolac, epinephrine, and morphine or hydromorphone. Relevant major inclusion criteria include primary surgery and opioid-naÃ¯ve status. Relevant exclusion criteria are revision surgery, recent bupivacaine or opioid usage, NSAID allergy, and other orthopedic surgeries that are not THAs. The primary outcome to assess is the presence of a Visual Analogue Scale (VAS) score of severe pain (greater than 7) during the admission. Secondary outcomes include elements of Enhanced Recovery After Surgery (ERAS) such as length of stay, total postoperative opioid consumption (in oral milligram morphine equivalents), time to ambulation and range of motion, hospital readmissions within three months relating to surgery, post-discharge opioid refills assessed at two weeks and at three-month follow-ups, and reported adverse effects attributable to opioid use, such as pruritis, nausea and vomiting, urinary retention, and CNS depression. Nominal data will be analyzed using the chi-square test of independence; continuous data will be analyzed using an unpaired t-test.
Results and Conclusions: Data collection is in progress. Results and conclusions will be presented at the Great Lakes Pharmacy Residents
Learning Objectives:
Discuss current American Academy of Orthopaedic Surgeons (AAOS) best-practice recommendations for acute surgical pain management in total hip arthroplasty (THA).
Identify the mechanism of action of bupivacaine-meloxicam and its use in total joint arthroplasty.
Self Assessment Questions:
Which of the following is a correct statement?
A. IV acetaminophen is preferred over oral acetaminophen by the American Academy of Orthopaedic Surgeons (AAOS) due to its inexpensive cost.
B. An NSAID is recommended by the AAOS to be included as part of a multimodal analgesia protocol.
C. Opioids are recommended to be used as frequently as possible to minimize preoperative and postoperative pain.
D. Clonidine is currently recommended by the AAOS to be included in total hip arthroplasty (THA) management.
Which statement is accurate regarding bupivacaine-meloxicam?
A. Meloxicam normalizes local pH of the joint to enhance the effect of unionized bupivacaine.
B. Bupivacaine-meloxicam does not have a boxed warning for risk of cardiovascular and gastrointestinal events.
C. Bupivacaine-meloxicam is applied to joints with a needle into the surgical site.
D. Bupivacaine-meloxicam produces postsurgical analgesia for up to 96 hours.
Q1 Answer: B Q2 Answer: A

Conversion of an Outpatient Pharmacy to a High-Capacity Mail Order Pharmacy within a Health System
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Background: The University of Illinois Hospital and Health Sciences System (UIH) has made the decision to convert an existing outpatient retail pharmacy to a closed-door, high-capacity, mail order pharmacy. Many of the services focused on providing direct patient care are moving to a new outpatient pharmacy, leaving behind all services utilizing mail order.

Statement of Purpose: The purpose of this project is to create standard operating procedures, develop communication strategies for engaging stakeholders, and assess metrics prior, during, and after implementation.

Methods: This is a single center, prospective pre/post-conversion analysis project. Standard operating procedures were established for processing, filling, verifying, and shipping prescriptions. Marketing tools utilized to communicate these changes to patients, staff, and other stakeholders included flyers, brochures, and reminder phone calls. The pre-conversion analysis was conducted from July 2022 to September 2022. The analysis conducted during the conversion took place between October 2022 and November 2022. The post-conversion analysis is scheduled to be performed between December 2022 and February 2023. The primary outcome metric is total prescription volume. Secondary outcomes include staffing ratios, staff engagement, and overall financial metrics related to this operational change. Prescription volume will be evaluated using reports from the dispensing system. Staff engagement will be evaluated via survey before and after the pharmacy conversion.

Results: The project is in the final phase of data collection and analysis is ongoing. Final results will be shared at the conference.

Conclusion: UIH anticipates successful conversion of a retail pharmacy to a closed-door, high-capacity mail order pharmacy. Collection and analysis of primary and secondary outcomes metrics will inform future decision making related to this pharmacy structure for UIH. Dissemination of these results will contribute to the body of pharmacy operations literature.
Learning Objectives:

Outline the steps needed to convert an outpatient pharmacy into a mail order pharmacy.
Describe the importance of standardizing workflows and operating procedures in the pharmacy.

Self Assessment Questions:

What is not a step in converting an outpatient pharmacy into a mail order pharmacy?

A. Standardize mail order workflows
B. Re-open the pharmacy to patients
C. Close the pharmacy to patient walk-ups
D. Renovate the pharmacy floor space to optimize prescription workflow

What is a direct benefit of standardizing operating procedures?

A. Increased efficiency in completing tasks
B. Tasks are completed in a similar manner no matter the employee
C. Increased cost associated with completing tasks
D. Both A and B

Q1 Answer: B Q2 Answer: D

Centralization of prior authorization services at a hospital-based infusion clinicÂ Â

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Purpose:

Medical denials have a significant impact on healthcare institutions including infusion clinics. These denials can not only slow down operations and decrease efficiency but can also lead to significant financial burden for the institution and the patient. Trinity Health Muskegon (THMU) operates hospital-based infusion clinics in the Muskegon and Shelby areas of Western Michigan, servicing approximately 8,000 patients combined annually. Previously, all authorizations and benefit verifications were handled by the referring provider practices. Gaps in this process led to a significant number of denials resulting in high out-of-pocket expenses to patients and posed risks to the organization. To address this issue, THMU centralized authorization and benefit verification by deploying two Financial Coordinators (FCs) into the standard workflow at the beginning of the fiscal year (FY) 2023. The goal of this quality improvement initiative is to evaluate the impact of centralizing prior authorization services at THMU infusion clinics.

Methods:

A retrospective cohort will compare the financial impact of pre- (July - December 2021) to post-centralization (July - December 2022) of benefit authorization services at THMUâ€™s hospital-based infusion clinics. Data will be obtained from Revenue Integrity and include claim and denial information of adult patients treated at THMU infusion clinics. Non-participating payor claims will be excluded. The primary endpoint will be the change in the number and cost of denials related to FC workflow between the time periods. Secondary endpoints include the change in the number and cost of all initial denials between time periods, type of initial denial by Claim Adjustment Reason Code (CARC), and the success of local denial recovery efforts (cost and number) post centralization.

Results/conclusion: To be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify the common causes of medical denials
Describe the role of financial coordinators (FCs)

Self Assessment Questions:

What are common causes of medical denials?

A. Registration/eligibility
B. Missing or invalid claim data
C. Authorization
D. All the above

What is/are the role(s) of financial coordinators (FCs)?

A. Ensuring medication coverage and optimization prior to appointment scheduling
B. Assisting with patient access
C. Preventing denials from commercial and government payors
D. All the above

Q1 Answer: D Q2 Answer: D

Development of Training Procedures for Hazardous Drug Compounding

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Purpose: Hazardous drugs may cause harm due to their neoplastic, carcinogenic, or teratogenic potential, and thus should be prepared by trained staff members in appropriate compounding environments to ensure safe and effective preparation of potentially dangerous medications. Although staff members typically receive introductory training, changes to procedures and a busy workflow can lead to unfamiliarity with training or lost confidence in skills. This study aims to create training procedures and yearly competencies for hazardous drug compounding which leading to sustainable, safe, and effective practices.

Methods: This project was approved by the Institutional Review Board. It was conducted in three phases over a period of six months. In the pre-training phase, staff were given a survey to assess their confidence and concerns prior to training. Staff were initially introduced to USP 800 standards via a presentation which covered proper garbing and gowning, exposure risk and procedures, and additional materials. The training phase consisted of physical training in a nonhazardous environment to allow for training of all staff regardless of limiting conditions. The primary author also supervised any hazardous drug compounding in the pharmacy during that time. Staff were supplied with a post survey to assess their confidence and any concerns which arose during and after training. The post-training phase is the ongoing provision of continuing education to maintain yearly competency. Survey data was de-identified and kept in HIPAA compliant condition, then discarded.Â

Results: During the post-training phase, staff were assessed on confidence in hazardous drug training. Staff were also oriented to training materials for refreshing on training and supplied with a post- training survey.Â Â

Conclusion: The Pre-training survey suggested the potential need for training or retraining of staff. The results of the post-training survey will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify strategies for training pharmacy staff to effectively compound hazardous drugs.

Recognize the importance of hazardous drug training for pharmacy technicians.Â

Self Assessment Questions:

What barrier(s) do pharmacy staff face when compounding hazardous drugs?

A. Limited experience

B. Lack of training

C. Hazardous potential (i.e. pregnancy, breastfeeding, etc.)

D. All of the aboveÂ

What is the importance of training staff to useÂ closed system transfer devices?

A. A closed system transfer device will eliminate allÂ potential contamination of the hazardous drug.

B. Hands on training ensures that the devices are used properly to safely and effectively compound hazardous drugs.

C. It is difficult to compound hazardous drugs without a closed system transfer device.

D. Hazardous drugs do not need to be compounded with a closed system transfer device.Â

Q1 Answer: D Q2 Answer: B

High-Dose Versus Low-Dose 4-Factor Prothrombin Complex Concentrate for Reversal of Direct Acting Oral Anticoagulants In Intracranial Hemorrhage

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Background -
Direct-acting oral anticoagulants (DOACs) are indicated for non-valvular atrial fibrillation and prevention/treatment of VTE, but they carry a risk of intracranial hemorrhage (ICH). The ROCKET-AF and ARISTOTLE trials found the risk of ICH to be 0.57% for rivaroxaban and 0.33% for apixaban. 4-factor prothrombin complex concentrate (4F-PCC) is used off-label for emergent DOAC reversal. The dose of 4F-PCC is controversial as some institutions use high-dose while others use low-dose 4F-PCC. This study aims to compare the efficacy and safety of high dose and low dose 4F-PCC for the reversal of ICH related to DOACs

Methods -
This is a single-center, retrospective cohort study that was conducted to compare the efficacy and safety of two doses of 4F-PCC for reversal of ICH related to DOACs. Doses studied were 25 units/kg (low-dose) versus 50 units/kg (high-dose) 4F-PCC (KcentraÂ®). Patients were identified by a search of orders for 4F-PCC between January 1, 2013 and September 30, 2022. Inclusion criteria were age greater than 18, apixaban or rivaroxaban use, ICH with reversal using 4F-PCC. Exclusion criteria were age under 18, any bleed other than ICH, reversal for surgery, and any other anticoagulant. Information studied includes pertinent patient imaging including the initial head CT, 24-hour re-imaging, coagulation-related laboratory studies, renal function, hepatic function, DOAC used, dose of DOAC, dose of 4F-PCC, any repeat doses of 4F-PCC, and mortality at 30 days. The primary objective is hemostatic effectiveness within the first 24 hours. This will be considered achieved if repeat CT imaging shows no change or improvement in hematoma size. Secondary outcomes to be looked at include thromboembolic events during first 7 days after 4F-PCC administration and death from coagulation-related causes.

Summary of results/Conclusions Reached -
To be presented.
Learning Objectives:
Outline the current literature comparing high versus low dose 4F-PCC.
Discuss the efficacy of high vs low dose 4F-PCC for DOAC reversal in the setting of intracranial hemorrhage.
Self Assessment Questions:
Kcentra (4 factor-prothrombin complex concentrate) holds an FDA approved indication for which of the following:
A. DOAC reversal
B. Tenecteplase reversal
C. Vitamin K antagonist reversal
D. Heparin reversal
The ROCKET-AF study found the risk of intracranial hemorrhage to be 0.57% for which drug?
A. Apixaban
B. Rivaroxaban
C. Edoxaban
D. Dabigatran
Q1 Answer: C Q2 Answer: B

Evaluation of Institutional Practice Versus Pediatric Community Acquired Pneumonia Guideline Recommendations
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Purpose: Optimization of antimicrobial utilization has become an increased focus, including within the pediatric population. The 2021 American Academy of Pediatrics Red Book offers enhanced recommendations for the duration of therapy and dosing parameters of select antibiotics in inpatient pediatric community-acquired pneumonia as compared to the 2011 Infectious Diseases Society of America/Pediatric Infectious Diseases Society guidelines. The purpose of this study is to analyze pediatric patients admitted for community-acquired pneumonia at our institution to assess prescribing patterns and guideline compliance with recommendations for empiric antibiotic selection, dosing, and duration of therapy in addition to de-escalation when indicated based upon cultures.

Methods: This will be a retrospective cohort study analyzing patients less than 18 years old at Carle Foundation Hospital who were admitted for community-acquired pneumonia from January 2011 through August 2022. The primary endpoints are the percentage of cases receiving guideline-recommended antimicrobial therapy, the percentage of patients receiving select durations of therapy (i.e. â‰¤ 5 days, 6-7 days, 8-10 days, 11-14 days, > 14 days), and the percentage of cases receiving guideline-recommended addition of methicillin-resistant Staphylococcus aureus coverage. Secondary endpoints include the percentage of patients having therapy de-escalated based on culture results (when available) and a descriptive analysis of ceftriaxone dosing according to weight and frequency.

Results: In process and will be presented at the 37th Annual Great Lakes Pharmacy Resident Conference.

Conclusion: In process and will be presented at the 37th Annual Great Lakes Pharmacy Resident Conference.

Learning Objectives:
Discuss the standard of care for the management of pediatric community acquired pneumonia.
Describe the management of pediatric community acquired pneumonia at Carle Foundation Hospital.
Self Assessment Questions:
Per 2011 IDSA/PIDS pediatric community acquired pneumonia guidelines, what medication is preferred in the inpatient setting when S. pneumoniae resistance rates are > 25%?
A. Meropenem
B. Penicillin G
C. Vancomycin
D. Ceftriaxone
Per 2021 AAP Red Book, what is the recommended duration of therapy for non-severe pediatric community acquired pneumonia?
A. 14 days
B. 21 days
C. 5 days
D. 7 days
Q1 Answer: D Q2 Answer: C

Time to Administration of Post-intubation Analgesia and Sedation Before and After a Quality Improvement Initiative
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Purpose: Rapid sequence intubation (RSI) is the standard of care in the emergency department (ED) for airway protection and management. Literature demonstrates that during the post-intubation phase adequately treating pain first followed by sedation reduces total time on a ventilator and improves mortality and morbidity. As a result, our institution adopted an analgesia-first then sedation post-intubation guideline, but we have seen mixed provider compliance. The purpose of this study is to compare our current ED post-intubation analgesia and sedation guideline compliance rates before and after implementation of a quality improvement intervention.

Methods: We plan to conduct a retrospective chart review study to assess our current management of post-intubation analgesia and sedation compared to our established ED guideline. Patients 18 years old and older who were intubated between June 2021 to March 2023 in the ED will be eligible for inclusion into this study. The primary endpoint will be to evaluate time to dose of both post-intubation analgesia and sedation medications after paralytic administration, before and after quality intervention implementation. Secondary endpoints will include correct selection of medications based on our ED guideline, correct sequence of drug administration (analgesia then sedation), difference in administration timing of post-intubation drugs when succinylcholine or rocuronium are used, difference in compliance between month, day of the week, or time of shift, and administration of sedative agents as intravenous bolus dosing versus continuous infusions.

Results/Conclusion: To be presented at the Great Lakes Pharmacy Resident Conference
Learning Objectives:
Recall the disadvantages of delaying administration of postintubation analgesia and sedation.
Recognize the immediate goal of postintubation care in the Emergency Department.
Self Assessment Questions:
What is the negative impact of inadequate analgesia and sedation following intubation?
A. Catatonic behavior
B. Psychological trauma
C. Tardive dyskinesia
D. Grand mal seizures
Appropriate postintubation management in the Emergency Department includes:
A. Utilizing an analgesia-first model.
B. Early deep sedation in most patients.
C. Optimizing the use of benzodiazepines.
D. Providing complete amnesia during the postintubation period.
Q1 Answer: C Q2 Answer: D

Tolerability of Rapid Initiation Versus Traditional Sequencing of Guideline Directed Medical Therapy in Newly Diagnosed Patients with Heart Failure with Reduced Ejection Fraction
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Purpose:
Current heart failure with reduced ejection fraction (HFrEF) guidelines recommend rapid initiation of a 4-drug regimen of guideline directed medical therapy (GDMT) to reduce mortality and morbidity. However, rapid initiation and titration of these therapies may increase the risk of adverse events. Additionally, the best approach for GDMT initiation and the tolerability of the 4-drug regimen in newly diagnosed HFrEF remains unclear. This study aims to compare the tolerability of initiating a 4-drug GDMT regimen to less aggressive GDMT initiation approaches (3 drugs or fewer) following hospitalization in patients with newly diagnosed HFrEF.

Methods:
A single center, retrospective study will be conducted for adult patients admitted to UIH between May 2021 and September 2022 with newly diagnosed HFrEF initiated on GDMT. Patients will be excluded if they are < 18 years old or pregnant. The primary outcome will compare a composite safety outcome composed of hypotension (systolic blood pressure < 90 mmHg or symptomatic), bradycardia (heart rate < 50 beats per minute or symptomatic), dizziness, fatigue, acute kidney injury (serum creatinine doubled from baseline), and elevated potassium (K > 5.5 mmol/L) between patients initiated on all 4 GDMT medications during the index hospitalization versus patients initiated on 3 GDMT medications or less. Secondary outcomes include factors leading to medication discontinuation or dose reduction, percentage of GDMT at > 50% of the target dose within or at 3 months, percentage of patients on all 4 GDMT medications at 3 months, number of hospitalizations due to heart failure exacerbation, and percentage of patients lost to follow up compared between the different initiation sequencing strategies.

Results/Conclusions:
Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference
Learning Objectives:
Review current guideline recommendations for the pharmacologic treatment of heart failure with reduced ejection fraction
Identify potential adverse reactions associated with rapid initiation of GDMT medications
Self Assessment Questions:
Which of the following GDMT medications is the most likely to cause hypotension?
A. Metoprolol Succinate
B. Empagliflozin
C. Lisinopril
D. Valsartan-Sacubitril
Which of the following is a potential cause of patients failing to achieve goal doses and therapy of HFrEF GDMT?
A. Hypertension
B. Tachycardia
C. Hyperkalemia
D. Hyponatremia
Q1 Answer: D Q2 Answer: C

Impact of a Pharmacist-Driven Medication Therapy Management Clinic on 30-Day Readmission Rate
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Unplanned readmissions within 30 days of discharge can negatively affect and increase costs for patients and healthcare systems. This study aims to understand the impact of a pharmacist-driven medication therapy management clinic on a health systemâ€™s readmission rates. The research question is, â€œDoes University of Illinois Hospital and Health Sciences Systemâ€™s (UI Healthâ€™s) Medication Therapy Management Clinic (MTMC) improve patientsâ€™ 30-day hospital readmission rates.â€ This is a single center, retrospective, cohort study approved by the institutional review board. Adult patients who have completed at least 2 appointments (one initial and one follow-up appointment) at UI Health MTMC during 2017 will be included. The primary outcome is difference in patientsâ€™ 30-day readmission rates before and after establishment with UI Healthâ€™s MTMC. The secondary outcome is difference in patientsâ€™ 60-day readmission rates. Data is collected through retrospective electronic medical record review. Demographic data includes age, gender, race, and comorbid conditions. MTMC-specific data includes referring department, reason for referral, medication distribution (i.e., synchronized vials, prefilled pill boxes, or other), and appointment frequency. Hospital-specific data includes number of hospitalizations 2 years before and 2 years after MTMC initial appointment, dates and lengths of hospitalizations, length between hospital admission, and admitting and discharge diagnoses.
Learning Objectives:
Explain how hospital readmissions affect the health system.

Describe the services provided by a pharmacist-driven medication therapy management clinic.

Self Assessment Questions:

What can occur as a result of excess hospital readmissions?

A. Private payer insurances are required to pay more than Medicare and Medicaid
B. Centers of Medicare and Medicaid Services reduces payments to these hospitals
C. Patients must pay for all subsequent 30-day readmissions out-of-pocket regardless of coverage
D. There are no consequences of excess hospital readmissions

What service(s) may be provided by a clinical pharmacist in a pharmacy-driven medication therapy management clinic?

A. Medication reconciliation
B. Medication and disease state management
C. Evaluate medication adherence and health literacy
D. All the above

Q1 Answer: B Q2 Answer: D

Evaluating the Use of Glucagon-Like Peptide 1 Receptor Agonists (GLP1 RA) in A Matched Cohort of Kidney and Liver Transplant Recipients

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agents compared to patients who did not

Methods: This single-center, retrospective analysis evaluated kidney and liver transplant recipients who were initiated on a GLP1RA for > 3 months (mo) matched to a comparator group (non-GLP1RA), based on organ type and diagnosis of diabetes at time of transplant. Primary endpoint was change in hemoglobin A1C (HbA1c) at 6 mo. Secondary endpoints included changes in weight, BMI, insulin requirements, and number of oral diabetic agents (ODAs). Safety outcomes included adverse events (ADE), biopsy-proven acute rejection (BPAR), graft loss, and mortality.

Results: Of the 74 patients included, 37 received GLP1 RA matched to 37 patients who did not. More patients in the GLP1RA group were on ODAs and 8 patients (27%) were initiated on GLP1RA <1 year from transplant. Change in median HbA1c in GLP1 RA group was -0.5% compared to +0.6% in the comparator group. Median change in total daily insulin units was â€“13 units vs +15 units in the GLP1RA vs comparator group. GLP1RA group median weight and BMI change was â€“7.4 kg, -3.1 kg/m2 vs â€“0.3 kg, +0.7 kg/m2 in comparator group, respectively. In the GLP1RA group, 7 patients (38.9%) experienced drug-related ADE with four (10.8%) leading to discontinuation. Eight patients (21.6%) in each group experienced BPAR. One patient had graft loss and no mortality occurred in the GLP1RA group compared to two patients with graft loss and two patient deaths in the comparator group.

Conclusion: GLP1RA lowered median HbA1c after 6 mo, with significant reductions in weight, BMI, and insulin requirements in kidney and liver transplant recipients. GLP1RAs are safe and effective early posttransplant, making them useful agents for management of metabolic complications.

Learning Objectives:

Identify risk factors for metabolic complications after solid organ transplantation
Discuss the safety and efficacy associated with the utilization of GLP1 RAs in post-transplant patients

Self Assessment Questions:

Which of the following risk factors are associated with developing post-transplant diabetes mellitus?

A. Older age
B. High body mass index (BMI)
C. Use of immunosuppressive agents
D. All of the above

Which is NOT considered a common adverse event associated with GLP1 RAs?

A. Gastrointestinal disorders
B. Headache
C. Hypertension
D. Injection site reaction

Q1 Answer: D Q2 Answer: C

Real-world Clinical Outcomes for Patients Prescribed Liraglutide (Saxenda) for Weight loss by their Primary Care Provider at a Large Academic Medical Center

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Background: Liraglutide (Saxenda) has been shown to be safe and effective when used for weight loss in patients without diabetes in randomized controlled trials, but there has been limited data on real world use in the primary care setting, and limited exploration of pharmacist involvement in the ambulatory clinic setting.5

Purpose: The purpose of this study is to assess real world clinical outcomes for patients prescribed liraglutide (Saxenda) for weight loss by their primary care provider at a large academic medical center.

Methods: This is a single-center retrospective descriptive study. Internal medicine and family medicine clinic patients prescribed liraglutide (Saxenda) for weight loss between October 1, 2020 and September 30, 2021 will be included in this study. Outcomes will be assessed for up to a year after patientsâ€™ first liraglutide prescription or until the medication is discontinued (if prescribed less than one year). The following data will be collected: demographics, weight, height, BMI, HgbA1c, previous weight loss surgery, comorbidities, â€‹â€‹medications prescribed at the time of liraglutide prescribing and at the end of the study that may result in weight gain, previous weight loss medications, and details regarding medication education received at the time of liraglutide (Saxenda) prescribing. The primary endpoint is change in weight from baseline at 12 months or at the time of discontinuation of liraglutide if prescribed for less than 12 months. Secondary endpoints include change in BMI from baseline, change in HbA1c from baseline, new diagnosis of diabetes (HbA1c â‰¥ 6.5%), blood pressure control, lipid control, reasons for discontinuation of liraglutide, adverse events, number of appointments completed with an ambulatory care pharmacist, and pharmacist interventions.

Results/Conclusions: This research study is currently in progress, results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify limitations to use of non-GLP-1 receptor agonist medications for weight management

Review the benefits of liraglutide (Saxenda) for weight management in patients without Type 2 Diabetes Mellitus

Self Assessment Questions:

Which of the following is a significant limitation to use of non-GLP-1 receptor agonist medications for weight management?

A. Drug shortages
B. Side effects
C. Contraindications
D. B and C

Which of the following may be benefits of the use of liraglutide (Saxenda) for weight management in patients without Type 2 Diabetes Mellitus?

A. Improvement in blood pressure control
B. Improvement in lipids
C. Improvement in anxiety
D. A and B

Q1 Answer: D Q2 Answer: D

Effects Of Reinitiating Antiplatelet Therapy On Hematoma Expansion After Traumatic Intracranial Hemorrhage

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Background: Traumatic intracranial hemorrhage (ICH) affects over 50,000 people in the United States yearly with 10% attributed to antiplatelet therapy (APT). Withholding APT post bleed places patients at risk for a thrombotic event, but this must be weighed against the risk of hematoma expansion or reoccurrence. There are limited studies that evaluate the risk and benefit of antiplatelet resumption after ICH, most of which focus on spontaneous ICH. The aim of this study is to evaluate the incidence of hematoma expansion in the antiplatelet group compared to the no antiplatelet group post traumatic ICH.

Methods: This retrospective matched cohort study will compare patients resumed on APT to patients not resumed after a traumatic ICH at an academic-affiliated health system between October 2012 through December 2022. Patients will be matched on Glasgow coma scale, age, and location of hemorrhage. Inclusion criteria are age â‰¥18 years, acute traumatic ICH, and APT prior to admission. Pregnant patients will be excluded. To detect a 3% difference, alpha set at 0.05 and beta of 0.2 a total of 1,810 patients must be enrolled. Continuous variables will be compared using Student t or Mann-Whitney test and categorical variables will be compared using Chi-square or Fisher exact tests, as appropriate. All cause in-hospital mortality will be analyzed via Kaplan-Meier. $P<0.05$ will indicate a significant difference for all outcomes.

Outcomes: The primary endpoint is the incidence of intracranial hemorrhage expansion during hospital admission. Secondary endpoints include the incidence of thrombosis (myocardial infarction, pulmonary embolism, deep vein thrombosis, etc.), and all cause in-hospital mortality both cohorts. Timing of ICH expansion to antiplatelet resumption will be explored including an analysis between single and dual antiplatelet subgroups.

Results: IRB approval is obtained, data collection and analysis are ongoing, and results will be presented at the 2023 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss current guideline recommendations for restarting antiplatelet therapy after an intracranial hemorrhage

Identify which of the following patient scenarios meets the inclusion criteria of this study?

Self Assessment Questions:

Which of the following statements aligns with the 2022 AHA/ASA guideline recommendation for antiplatelet therapy in patients with intracerebral hemorrhage?

A. Individual assessment of the patient's risk and benefits of antiplatelet therapy should be considered, however there is a lack of data on the optimal timing for resuming antiplatelet therapy.

B. Antiplatelet therapy should be restarted in all patients following an intracranial hemorrhage

C. Antiplatelet therapy should never be restarted in patients after an intracranial hemorrhage

D. Antiplatelet therapy should be restarted in two weeks after the hemorrhagic event and should not consider patient specific factors

Select the patient that meets inclusion criteria based on the research protocol

A. A 13-year-old male presented to the ED following a MVC found to have a SAH on head CT, GCS 13

B. A 74-year-old female presented to the ED for AMS found to have an ischemic stroke, GCS 9

C. A 45-year-old female presented to the ED following a fall down stairs with positive CT head findings for intracerebral hemorrhage, GCS 14

D. A 63-year-old male presented to the ED found down with a TBI secondary to anoxic injury, GCS 4

Q1 Answer: A Q2 Answer: C

Time spent at home by patients with AML: FLAG vs HMA + Venetoclax regimen

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Often, patients diagnosed with AML can be poor candidates for traditional intensive curative intent therapies and must receive a low-intensity regimen, such as hypomethylating agent + venetoclax (HMA+Ven). Time spent away from a hospital/clinic setting can be an indicator of better quality of life, thus previous research has been done to determine where patients receiving the azacytidine +/- venetoclax (an HMA+Ven variant) spend their time. At Michigan Medicine (MM), patients who cannot undergo intensive chemotherapy may alternatively receive fludarabine, cytarabine +/- granulocyte colony-stimulating factor (G-CSF) (FLAG) based on patient characteristics and provider preference. The comparative distribution of time spent in care with FLAG compared to HMA+Ven would help inform patients and providers when making regimen selections. The primary objective of this study is to compare the composite proportion of time spent in various areas of care in patients with AML receiving treatment with HMA+Ven or FLAG.

Methods: This is a retrospective, single-center, cohort study. Patients 18 year and older with previously untreated AML receiving HMA+Ven or FLAG regimen were evaluated. Exclusion criteria were as follows: receipt of idarubicin during FLAG therapy, hematology care follow-up occurring outside of MM. The primary endpoint is the proportion of days spent at home (PDH) compared between regimens, where PDH is calculated as 1 minus days spent in contact with healthcare. Other endpoints include time spent within each area of healthcare between groups and factors affecting PDH between regimens.

Results/Conclusions: Data collection and analysis are currently in progress. Final results and conclusions from analysis will be presented at the 2023 Great Lakes Pharmacy Residency Conference.

Learning Objectives:
Recognize commonly utilized options for induction in unfit patients with AML
Describe the amount of health care contact time, away from home, experienced by patients receiving HMA + Ven therapy
Self Assessment Questions:
Which of the following medications is part of the FLAG regimen?
A. Adriamycin
B. Gilteritinib
C. Fludarabine
D. Leucovorin
2. According to previously published data, what is the expected proportion of days spent at home (PDH) for patients receiving HMA + Ven therapy?
A. 0.7
B. 0.5
C. 0.3
D. 1
Q1 Answer: C Q2 Answer: B

Preventing Oral Targeted Antineoplastic Drug Interactions at Therapy Initiation: A Pharmacist's Impact
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In recent years, oral targeted antineoplastic therapies have increased in development and use for cancer therapy. While these agents provide many benefits to patients, several studies have identified significant drug interactions associated with these therapies. Literature from 2018 identified severe drug interactions in 45% of patients on tyrosine kinase inhibitors which was three times higher than the interactions found in non-targeted therapies. To address the potential for interactions, the Hematology/Oncology Pharmacist Association released a pharmacy practice standard for pharmacist management of oral antineoplastic therapies. The standard outlines the pharmacistsâ€™ role in prescribing, education, dispensing and distribution, and monitoring and follow-up. Modeling these standards, Franciscan Physician Network Oncology/Hematology Specialists created a pharmacist role specific for the management of oral antineoplastic therapy which includes addressing medication interactions. The purpose of this study was to identify incidence of drug interactions with oral targeted antineoplastic agents and assess a pharmacist's impact on interaction management.
Methods
The study was a retrospective chart review approved by the Franciscan Alliance Institutional Review Board. Patients >18 years of age initiated on an oral targeted antineoplastic agent at Franciscan Physician Network Oncology/Hematology Specialists between July 2020 and July 2022 were eligible for inclusion. The primary outcome was incidence of pharmacist intervention in the management of moderate/severe drug interactions at oral targeted antineoplastic therapy initiation. Secondary endpoints included frequency of moderate/severe drug interactions identified at therapy initiation, frequency of pharmacokinetic and pharmacodynamic drug interactions, proportion of interactions managed by the pharmacist in accordance with Lexicomp/LexiInteractâ€™s management recommendation, and incidence of adverse effects or therapy modifications within 60 days in patients who did not have their therapy altered via pharmacist intervention when a moderate/severe drug interaction was identified. Data will be characterized using descriptive statistics.
Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.
Learning Objectives:

Define pharmacokinetic and pharmacodynamic drug interactions.
Identify drug interaction databases with high sensitivities for detecting known interactions with oral antineoplastic medications.

Self Assessment Questions:

Drug interactions can be identified as pharmacokinetic or pharmacodynamic in nature. Which of the examples below is a pharmacokinetic drug interaction?

A. Everolimus (hyperglycemia-associated agent) diminishing the therapeutic effect of glimepiride
B. Acetaminophen enhancing the hepatotoxic effect of dasatinib
C. Lenvatinib enhancing the QTc-prolonging effect of citalopram
D. Carbamazepine (strong CYP3A4 inducer) decreasing the serum concentration of ibrutinib (major CYP3A4 substrate)

Which of the following drug databases holds the highest sensitivity for detecting known interactions with oral antineoplastic medications?

A. Lexicomp/LexiInteract
B. Epocrates
C. Micromedex
D. Facts & Comparisons

Q1 Answer: D Q2 Answer: A

Impact of ustekinumab trough levels on clinical outcomes in patients with inflammatory bowel disease

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Purpose: Ustekinumab is used in inflammatory bowel disease (IBD) to treat bio-experienced and bio-naÃ¯ve patients. The approved dosing frequency is every eight weeks, although many patients require a shorter interval. Currently, the decision on ustekinumab dosing frequency is primarily driven by patient-reported outcomes rather than drug levels. Previous studies show that a change in drug levels may impact clinical outcomes in IBD. There is limited research on the correlation between ustekinumab drug levels and clinical outcomes, especially with ulcerative colitis. The objective of this study was to determine the impact of ustekinumab trough levels on clinical outcomes in IBD patients.

Methods: This was a retrospective cohort study of adult IBD patients seen at the University of Louisville Physicians Gastroenterology practice between January 1, 2016 and December 31, 2022. Patients 18 years of age and older who have a diagnosis of either Crohnâ€™s disease or ulcerative colitis and have been initially infused with ustekinumab were included in the study. Patients on any maintenance dose of ustekinumab at a dosing frequency longer than eight weeks or currently using another biologic were excluded. Patients with both types of IBD were divided into three treatment arms: ustekinumab trough levels <2.0, trough levels 2.0 to 4.5, and trough levels > 4.5. The primary endpoint was Crohnâ€™s Disease Activity Index (CDAI) in Crohnâ€™s disease and Simple Clinical Colitis Activity Index (SCCAI) in ulcerative colitis. Secondary endpoints included endoscopic healing, albumin, and inflammatory lab values. This study looked at the correlation between ustekinumab trough levels and these clinical outcomes in both Crohnâ€™s disease and ulcerative colitis. A statistician was consulted to analyze outcomes.

Results/Conclusions: Data collection is ongoing. Results and conclusions will be presented at 2023 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recognize clinical outcomes that can indicate the severity of inflammatory bowel disease
Recall the therapeutic and target trough levels of ustekinumab

Self Assessment Questions:

Which of the following lab values decreases with worsening inflammatory bowel disease?

A. Albumin
B. Fecal calprotectin
C. C-reactive protein
D. Erythrocyte sedimentation rate

What is the target trough level for ustekinumab?

A. > 2.0 mcg/mL
B. > 2.5 mcg/mL
C. > 4.0 mcg/mL
D. > 4.5 mcg/mL

Q1 Answer: A Q2 Answer: D

No Filter? No Fear: Inpatient Adult Renal Dosing Clinical Decision Support at Order Entry

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have it. And while many suffer from irreversible kidney damage, acute kidney injury (AKI) can still have longstanding impacts on a patient's overall health. Any form of renal impairment can slow drug clearance, causing drug accumulation and increase its effects. Clinical decision support (CDS) may provide some assistance in identifying medications needing renal dose adjustments. The purpose of this project is to implement two options for prospective renal dosing CDS in hospitalized adult patients and assess the rate of appropriately dosed medications in patients with renal impairment with and without CDS tool.
Methods: This project requires identifying internal and external guidelines that serve as the foundation for renal dosing utilized in the clinical decision support. Then, renally dosed medications are separated into two groups of ten medications each based on volume of orders and therapeutic class. In phase one, ten medications will have one type of order entry CDS, and the other ten medications will have a separate order entry CDS. The study will also have a second phase where all twenty medications will have both types of CDS active simultaneously. Afterwards, a workgroup of physicians and providers will evaluate the utility of each tool. Three months of data will be collected during each phase of the project (six months total) to evaluate the volume of inappropriately dosed medications upon order entry.
Results: Data analysis currently underway, results from the quality improvement study to be discussed at Great Lakes Pharmacy Residency
Learning Objectives:
Define the types of clinical decision support that can be created for renal dosing
Discuss the process of implementing and maintenance of renal dosing clinical guidance at order entry
Self Assessment Questions:
What types of clinical decision support are options for renal dosing?
A. Interruptive dose alerts
B. Written clinical content at order entry
C. Dynamic dose/frequency buttons at order entry
D. All of the above
Which of the following are important when considering implementing renal dosing clinical decision support tools?
A. Use validated renal dosing resources
B. Incorporate providers in clinical decision support decisions
C. Identify if the tool should be passive or active
D. All of the above
Q1 Answer: D Q2 Answer: D

Designing Business Continuity and Downtime Activities Planning for Pharmacy Services within an Academic Medical Center
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automated dispensing cabinets) and patient care. Health system pharmacies are reliant on networks, software, and electronic processes that are secured from such attacks; however, many organizations do not have adequate plans in place when automated processes are offline. Business continuity plans assist an organization to ensure critical services and processes are maintained, restored, or augmented to meet the designated recovery time.

Project aims include evaluating and implementing a strategic plan for sustainable business continuity across UW Healthâ€™s acute care pharmacy services including a post-disruption recovery plan to be followed in the event of an unplanned downtime event causing an interruption in services provided.

Methods:
The first phase of the project was to conduct a baseline risk assessment related to downtime activity procedures for acute pharmacy services at UW Healthâ€™s University Hospital (UH), East Madison Hospital (EMH), and Consolidated Services. Workgroups were formed related to automation and technology; electronic health records; operational, and clinical workflows; and administrative services to strategize downtime mitigation and recovery needs. The second phase was to design and implement downtime planning for critical systems with key expert matter stakeholders. Following the creation of critical emergency operational plans, education and awareness will be disseminated to key pharmacy leaders and staff. The final phase will be to identify and implement processes for on-going upkeep.

Outcomes and Impact:
At UW Health, a risk assessment was performed, and identified UW Healthâ€™s electronic health record and pharmacy automation and technology as high-priority risk areas related to performing key operational, clinical, and administrative services. By implementing specific downtime planning activities, UW Health will be able to sustain operations and clinical services, supporting recovery efforts in unplanned downtime events. Future outcomes anticipated late spring-early summer 2023.

Learning Objectives:
Describe the impacts of cybersecurity attacks on a health system

Identify mitigation principles in the event of unplanned downtime related to a cybersecurity attack

Self Assessment Questions:

Which of the following pharmacy workflows could be impacted in the event of a cybersecurity attack?

A. Electronic Health Record (EHR)
B. Communication platforms
C. Medication safeguards and automation software
D. All of the above

What organizational stakeholders should be involved immediately in the event of a cybersecurity attack?

A. Pharmacy leaders
B. Nursing leaders
C. Medical Provider leaders
D. There should be a plan to identify all direct and indirect patient care leaders including but not limited to pharmacy, nursing, medical, informational technology, supply chain, security and transportation

Q1 Answer: D Q2 Answer: D

Exploring opportunities for pain management clinical pharmacist practice in perioperative transitions of care, oncology, and palliative care

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Purpose: With the opioid epidemic, there have been shifts surrounding pain management care and guidance. During this time, pain management clinical pharmacist practitioners (CPPs) have become more prevalent and relied upon for opioid tapers, urine drug screen interpretations, opioid rotations, and multimodal pain management recommendations. With the establishment of pain CPPs across VA facilities in primary care, growth into other areas has begun. This project will assess current VA pain management CPP roles in the oncology, palliative/hospice, and perioperative settings as well as potential barriers encountered for growth in these areas.

Methods: This study will be conducted as a national field query sent out to VA pain management pharmacists through the Clinical Pharmacy Practice Office (CPPO) email list. Microsoft Forms will be the platform utilized for the field query which will allow for anonymous responses. Descriptive statistics will be used when reporting results of the survey. Based on the results of the survey, a final deliverable will be created and distributed to pain CPPs across the nation.

Results & Conclusions to be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss the roles of pain management pharmacists
Identify barriers to growth in the oncology, palliative, and perioperative settings

Self Assessment Questions:

Which role(s) aligns most closely with the responsibilities of a pain management pharmacist?

A. Opioid taper
B. Urine drug screen results interpretation
C. Nonopioid pain management recommendations
D. All of the above

What was the most reported barrier for pain management pharmacist expansion into the perioperative setting?

A. Confidence/competency of the CPP
B. Lack of time/coverage
C. Lack of leadership support
D. Surgical services not provided at the facility

Q1 Answer: D Q2 Answer: C

Comparison of Full versus Reduced Initial Pazopanib Dosing in Advanced, Recurrent, and Metastatic Sarcoma: Retrospective Review

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Statement of purpose: Part 1: Describe real-world efficacy and toxicity of pazopanib in patients with advanced, recurrent, or metastatic soft tissue sarcoma (STS) at Indiana University Health Simon Cancer Center (IUSCC); Part 2: Compare the time on therapy, progression-free survival, overall survival, and toxicity for patients treated with different initial dosing (pazopanib 800 mg daily vs. 200 mg daily) between the cohorts at IUSCC and University of North Carolina Medical Center
Statement of methods used: An Institutional Review Board approved, multicenter, retrospective study was conducted in patients ages 18 years or older who received at least one dose of pazopanib. Patients were treated with pazopanib between May 2015 and October 2022 at IUSCC. Data collected included patient demographics, histology subtype, tumor grade, pazopanibâ€™s line of therapy, prior lines of therapy, and baseline bilirubin. The primary outcome was time on pazopanib therapy. The secondary outcomes were progression-free survival according to RECIST (Version 1.1) by imaging, overall survival, frequency and types of adverse events, reason for discontinuation of therapy, and frequency and reason for dose reduction.
Summary of (preliminary) results to support conclusion: Results of part 1 are pending and will be shared at the conference.
Conclusions Reached: Results of part 1 are pending and will be shared at the conference.
Learning Objectives:
Identify pazopanibâ€™s place in therapy for the treatment of soft tissue sarcoma.
Recognize the FDA-approved doses of pazopanib for the treatment of soft tissue sarcoma.
Self Assessment Questions:
Which of the following is the correct pazopanibâ€™s place in therapy?
A. First-line therapy for advanced, recurrent, and metastatic sarcoma
B. Subsequent lines of therapy for newly diagnosed sarcoma
C. Subsequent lines of therapy for advanced, recurrent, and metastatic sarcoma
D. First-line therapy for newly diagnosed sarcoma
Which of the following is the FDA-approved initial dose of pazopanib for the treatment of sarcoma?
A. 800 mg once daily for patients without baseline moderate hepatic impairment
B. 400 mg once daily for patients with baseline moderate hepatic impairment
C. 200 mg once daily for patients without baseline moderate hepatic impairment
D. 600 mg once daily for patients without baseline moderate hepatic impairment
Q1 Answer: C Q2 Answer: A

Pharmacoeconomic Analysis of the Addition of a Pharmacist to Outpatient Heart Failure Care
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recommend a set of four medication classes, commonly referred to as guideline directed medical therapy (GDMT) or quadruple (quad) therapy. Numerous studies have demonstrated that GDMT reduces morbidity and mortality in patients with heart failure with reduced ejection fraction (HFrEF). Current studies demonstrate the beneficial impact of the inclusion of a pharmacist in outpatient HF care on outcomes such as achievement of maximally-tolerated GDMT and decreasing hospitalization. However, there is a lack of literature regarding the financial benefit of the addition of a pharmacist to outpatient HF care. The objective of this study is to evaluate return on investment and clinical impact of the addition of a pharmacist to outpatient heart failure care.

Methods: A single center, retrospective, cohort study was conducted for all patients who completed a visit with a pharmacist for HFrEF between August 2021 and January 2023. The intervention group had patients following with an outpatient cardiologist with pharmacist involvement, while the control group were managed by an outpatient cardiologist or primary care physician only, with no pharmacist involvement. Patients were excluded if they were less than 18 years old or had an ejection fraction (EF) greater than 40% at baseline. The primary outcome was expected return on investment (ROI) for reimbursement per clinic visit calculated using the expected return, in dollars, for incident to-billing codes (e.g., 99211). Secondary outcomes included proportion of patients on maximally-tolerated doses of GDMT, speed of GDMT titration from first provider visit, number of hospitalizations and emergency department visits due to HF, prescription capture rates and prescription reimbursement rates.

Results: Data collection is ongoing.

Conclusions: Final results will be presented at the 2023 Great Lakes Pharmacy Resident Conference.

Learning Objectives:
Identify the potential benefits of the addition of a pharmacist to outpatient heart failure care according to published literature
Recognize the services pharmacists can for bill under a collaborative practice agreement (CPA) in an outpatient heart failure clinic
Self Assessment Questions:
According to current literature, which of the following is an advantage of incorporating a pharmacist as a member of the outpatient heart failure care team?

A. Decrease in hospitalizations and mortality due to HFrEF
B. Higher proportion of patients on triple and quad GDMT
C. Increase in medication access through formulary review and co-pay assistance
D. All of the above

Which of the following is the appropriate billing level for a pharmacist titrating up heart failure medications under a collaborative practice agreement (CPA)?

A. Level 1 (99211)
B. Level 2 (99212)
C. Level 3 (99213)
D. Pharmacists cannot bill for this service

Q1 Answer: D Q2 Answer: A

Assessment of PGY-1 Pharmacy Resident Final Projects and Associated Publication Outcomes

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Background: Burnout is a well-documented phenomenon in the pharmacy profession. A knowledge gap exists concerning the potential impact of pharmacy preceptor participation in residency research projects on pharmacist burnout. As part of the â€œadvancing practice and improving patient care,â€competency area, each resident is required to â€œeffectively develop and present, orally and in writing, a final project report.â€Many residency programs do not have staff with necessary training or adequate resources to provide a structed research curriculum, therefore creating additional difficulties completing project requirements necessary for achieving and maintaining American Society of Health-System Pharmacists (ASHP) accreditation. The goal of this study was to characterize teaching and learning strategies utilized to develop PGY-1 pharmacy resident final projects to better understand the strain on individual residency programs and identify potential strategies for how to improve current practices. Secondary objectives included evaluating publication rates of abstracts submitted to Great Lakes Pharmacy Residency Conference (GLPRC), identifying the types of projects submitted for publication, describing residency program director (RPD) perceptions on the value of research, and identifying perceived barriers to research completion during a one-year pharmacy residency.
Methods: PGY-1 RPDs whose residents present their projects at GLPRC were invited to complete a 45-question online survey. The survey focused on each programâ€™s preceptor research skillset, RPDâ€™s perceptions of resident research, institution-specific research requirements, barriers to publication, and perceptions of the ideal research program. In addition, a retrospective analysis of publication rates for PGY-1 pharmacy resident abstracts submitted to GLPRC in 2013, 2016, and 2019 was conducted. Every third abstract was assessed for publication through the PubMed and Google Scholar databases. Additional data collected on resident abstracts included project type, specialty area, journal type, and year published.
Results: Data collection and analysis are ongoing.
Conclusions: To be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss the impact participation in a pharmacy residency program has on pharmacist burnout.
Describe how ASHP accreditation standards are met with pharmacy resident research projects.Â

Self Assessment Questions:

There are many factors related to participation in pharmacy residency programs that may lead to preceptor burnout. When pharmacy preceptors participate in residency research, which of the following characteristics may contribute to burnout?

A. Emotional exhaustion
B. Depersonalization
C. Decreased personal accomplishment
D. All of the above

Per the ASHP objectives and standards for PGY-1 pharmacy residency programs, residents must complete:

A. A final project presentation, delivered orally and in writing
B. A final oral presentation given at a national meeting
C. A final written manuscript submitted to a peer-reviewed journal
D. None of the above, residents are not required to complete a final project

Q1 Answer: D Q2 Answer: A

Revision of a Pharmacist-Driven Heparin Protocol

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Aim of this study is to compare and assess the effects of heparin protocol changes pre and post implementation of a revised unfractionated heparin (UFH) protocol. This is to better reflect guidelines and the changing population. Since the previous updates to the UFH protocol, the guidelines from ACC dosing for ACS dosing, and the CHEST dosing for DVT/PE have been updated. The revised UFH protocol will take into account these changes as well as infusion adjustments based on the aPTT. Studies show populations suffering from obesity seem to have a longer time to therapeutic aPTT with flat rate dosing adjustments. The revised protocol will adjust based on weight to shorten time to therapeutic aPTT in this patient population. Primary outcome of the study is time to therapeutic aPTT; secondary outcomes: the incidence of two consecutive therapeutic aPTTs, a subgroup analysis in obese population based on BMI. This will take place at Ascension Borgess Hospital in Kalamazoo, MI. The study is a prospective quality improvement initiative with a retrospective comparator group. Data was collected using monitoring forms required to be completed by pharmacists when patients are initiated on heparin. Data collection of 75 patients in the ACS dosing protocol, and DVT/PE, were obtained in the retrospective portion from 1-1-2022 to 1- 2-2023. The revised protocol went live 1-23. Staff were educated on the changes in 12-22 with an informational video going over the changes, as well as a powerpoint. Data collection for the prospective portion began 1-23. Patients included were those that were receiving pharmacy to dose (PTD) heparin, and that have had at least two aPTT checks after initiation of heparin infusions. Excluded if heparin was not PTD, if heparin was started at an outside facility, or if there was an omission of the initial bolus.

Learning Objectives:

Describe the changes made to the pharmacist driven heparin protocol at Ascension Borgess Hospital

Review the results of the pre and post protocol changes on time to therapeutic aPTT

Self Assessment Questions:

Who is responsible for setting the therapeutic range for unfractionated heparin?

A. American College of Cardiology

B. CHEST guidelines

C. The individual institution

D. Lexicomp

Flat rate dosing of unfractionated heparin is superior to weight based dosing?

A. TRUE

B. FALSE

C. n/a

D. n/a

Q1 Answer: C Q2 Answer: B

Readiness of Grocery Store Pharmacists to Prescribe Hormonal Contraception

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Objectives Pharmacist prescribed hormonal contraception is rapidly expanding. Early adopter states that have extended prescriptive authority to pharmacists has shown an increase in contraception access for patients, strong patient satisfaction, and support from physicians. As contraception prescribing becomes a more common component of the portfolio of pharmacistsâ€™ clinical services, data informing pharmacists educational needs to confidently provide the service is limited. Community pharmacy practices that wish to implement contraception prescribing more broadly and effectively may benefit from a current analysis of pharmacist perceptions of their educational needs. The purpose of this study is to explore the perceived comfort, confidence, and readiness of community pharmacists to prescribe hormonal contraceptives. The objectives of this study are to determine grocery store pharmacistsâ€™ perceptions of readiness to prescribe hormonal contraceptives, identify potential gaps in education, and to determine the educational resources needed by pharmacists to effectively engage in hormonal contraception prescribing.

Methods: Semi-structured, face-to-face interviews will be conducted with community pharmacists from a regional grocery chain that operates in jurisdictions where pharmacist prescribing of hormonal contraception is allowable via collaborative practice but is not currently operational within the pharmacy. Interview questions are designed to gather insight on pharmacist readiness with prescribing of hormonal contraception. Additionally, questions focus on the perceived educational needs and resources necessary to promote confidence and comfort with pharmacist prescribing of hormonal contraception. The interviews will be recorded, transcribed, and coded by investigators to identify common themes. Thematic analysis will be completed following the interviews and subsequent explanations will be developed for each theme from the interviews.

Results: Research in progress.

Conclusion: Research in progress.

Learning Objectives:

Describe the current landscape of community pharmacists prescribing hormonal contraceptives.

Identify pharmacists' perceived barriers in prescribing of hormonal contraceptives in the community pharmacy.

Self Assessment Questions:

At the time of this presentation, how many states allow for some degree of pharmacists' prescribing of hormonal contraception.

A. Less than 5

B. 6 to 10

C. 11 to 15
D. greater than 16
Based on the interviews conducted, which of the following statements is false regarding pharmacists' perceived readiness with prescribing hormonal contraception?
A. Pharmacists feel that policy and procedure would increase readiness.
B. pharmacists feel ready but do not have an interest in providing this service.
C. Pharmacists would like more education and training to feel ready.
D. Pharmacists view staffing, workload, and patient privacy as barriers to providing this service effectively.
Q1 Answer: D Q2 Answer: B

The Intersection of Insomnia and Centralized Pain in Older Adults

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studied but has yet to be reviewed specifically in centralized pain conditions. The objective of this study is to assess the effect of age on diagnoses of insomnia and/or centralized pain.

METHODS: This was a single center, retrospective, observational cohort study that describes the effects of age on the rate of insomnia and/or centralized pain diagnoses in older adults at University of Michigan Health (UMH) from January 1, 2016 â€“ January 1, 2022.

Older adults (â‰¥55 years old) with a diagnosis of insomnia and/or centralized pain were included. Patients were identified using validated algorithms for insomnia and centralized pain. Each cohort identified was cross-referenced for the other condition to identify those subjects with overlapping insomnia and centralized pain. Each cohort (insomnia, centralized pain, or both) was further stratified into the following age groups: 55-64, 65-74, 75-84, and â‰¥ 85 years of age. The primary outcome is the proportion of older adults with insomnia and/or centralized pain. The primary outcome will be met if at least one centralized pain diagnosis is coded in an individualâ€™s electronic health record within one year of the diagnosis of insomnia.

RESULTS/CONCLUSIONS: To be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:
Describe the different types of pain and their impact on older adult patients.
Explain the relationship between centralized pain and insomnia in older adults.
Self Assessment Questions:
Which of the following statements is correct regarding pain?
A. Nociceptive pain is pain that arises from a dysfunction in the nervous system
B. Neuropathic pain is pain that is a result of damage to somatosensory system
C. Nociplastic pain is acute pain that is a result of physical damage or potential damage to the body
D. Patients may have mixed pain in which they have overlapping pain types that may include nociceptive, neuropathic, and/or nociplastic pain
Which of the following is correct?
A. Combination of medications used to treat insomnia and pain decreases risk of mortality in older adults
B. There is a significant amount of literature explaining the relationship between interaction of pain and insomnia
C. Insomnia is associated with a higher risk of falls, depression, anxiety, and mortality
D. Up to 25% of older adult have a diagnosis of insomnia and up to 5% of older adults with insomnia also suffer from chronic pain
Q1 Answer: D Q2 Answer: C

Improving Medication Acquisition Turnaround Time in a Rare Cancer and Precision Medicine Clinic

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Froedtert & the Medical College of Wisconsin launched a Rare Cancer and Precision Medicine Clinic (RCPMC) in January 2022. Patients referred to the clinic are diagnosed with cancers which have exhausted all options for standard treatment and can potentially be treated with off-label medications based on tumor genomic sequencing. The acquisition process for off-label medications is complex and requires multiple steps to navigate the intricacies of insurance coverage. A time intensive part of this process is creating a letter of medical necessity (LOMN) for the appeal process. Delay in medication acquisition can negatively affect patient outcomes, and also impact quality and cost of care.

The primary objective of this quality improvement project is to reduce the turnaround time (TAT) from when the need for a LOMN is identified, to when the LOMN is submitted to insurance. We believe this can be done by creating a tool built into the electronic health record (EHR), which provides a structured template to increase the efficiency of creating a LOMN. Secondary objectives include increasing percentage of LOMN documented in the medical record, decreasing overall time to treatment initiation, and creating patient education material regarding the medication acquisition process. Data was collected pre-intervention and will be compared to post-intervention data to assess if creating a LOMN template improved TAT and decreased time to medication acquisition.

Our template was implemented in January 2023. Pre-intervention data showed the average time for receiving a LOMN was 402 hours (1-1627) and the percentage of LOMN documented in the EHR was 7.8% (5/64). Overall, the average time to medication initiation was 642 hours (0-2037).

Conclusions are pending. Our team was selected for the 2022-2023 cohort of the joint Hematology/Oncology Pharmacist Association and American Society of Clinical Oncology Quality Training Program, focused on improving care for patients receiving oral anticancer agents.

Learning Objectives:

Define â€œLetter of Medical Necessityâ€ and explain the nuances of its use in insurance claims

Describe the utility and functionality of specific tools used in quality improvement research

Self Assessment Questions:

What is a letter of medical necessity and what is its utility in regards to insurance claims?

A. A formal written argument from a healthcare provider to the patient detailing why a medication or therapy is medically necessary

B. A formal written argument from a healthcare provider to insurance payers detailing why a medication or therapy is medically necessary

C. An informal phone call from the patient to insurance payers detailing why a medication or therapy is medically necessary

D. An informal phone call from a healthcare provider to the insurance company detailing why a medication or therapy is not medically necessary

Which of the following statements defines a priority payoff matrix?

A. A pictorial representation of quality improvement interventions to help determine magnitude of impact and ease of implementation

B. A pictorial representation of all possible causes related to a problem to identify the root cause(s)

C. A graphical representation of all observed data to track trends over time

D. A graphical representation of all problems related to an process that show relative frequency and potential for improvement

Q1 Answer: B Q2 Answer: A

Opportunities for Pharmacists to Improve Anticoagulation Dosing and Monitoring Following Discharge at a Community Hospital

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Background
Anticoagulants are high-risk drugs that require careful monitoring and individualized dosing. These medications have complicated dosing regimens and many drug interactions. Inappropriate dosing or inadequate monitoring increases the risk of negative patient outcomes. Pharmacists at our community hospital provide anticoagulation dosing and monitoring assistance during admission; however, these services are not consistently provided at or after discharge. Hospitals that have a high 30-day readmission rate may be subject to penalties from the Centers for Medicare and Medicaid Services. Hospitals must evaluate their excess readmission rates and develop a correction plan. According to a recent meta-analysis, pharmacist-managed anticoagulation programs are associated with a reduction in readmissions due to bleeds or clots and lower patient mortality. This study seeks to determine if there is an opportunity for pharmacist involvement in anticoagulation dosing and monitoring during and after discharge at our community hospital.
Methods
A retrospective analysis of patients discharged on new or modified anticoagulant regimens will be performed. Data will be collected on the appropriateness of new prescriptions, follow-up after discharge, anticoagulation-associated readmission rates, and all-cause mortality. The principal researcher will examine discharge data from our community hospital. Readmission data will be captured utilizing the electronic medical record within the entire health system organization. Data will be segregated by anticoagulant, and descriptive statistics will be run separately for each medication. Patients who are receiving post-operative prophylactic anticoagulation will be excluded.
Results will be assessed and may be used for justification for expansion of pharmacy services at our community hospital.

Results and Conclusion:
Results will be assessed and may be used for justification for expansion of pharmacy services at our community hospital.
Data collection and review is pending

Learning Objectives:
Identify opportunities available to pharmacists to mitigate negativeÂ outcomes in anticoagulated patients
Discuss proper monitoring of patientsÂ newly prescribed anticoagulants
Self Assessment Questions:
What clinical pharmacy interventions can be implemented to optimize patient outcomes in anticoagulated patients?
A. No intervention is required by pharmacists
B. Only intervene on patients newly prescribed anticoagulants
C. Develop collaborative practiceÂ policies allowing pharmacists to intervene in dosing and patient monitoring after discharge
D. Report anticoagulant related adverse event to MedWatch
What post-discharge monitoring is necessary for a patient newly prescribed warfarin a with unstable INR?
A. Check INR daily
B. Check INR within 1-3 days
C. Check INR within 5-7 days
D. Follow-up with cardiologist in 2-4 weeks
Q1 Answer: C Q2 Answer: D

Impact of Blood Glucose Control on Length of Stay for Hospitalized Patients with Acute Infection
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Purpose:
This retrospective study evaluates blood glucose (BG) levels of hospitalized patients within progressive medical units treated for an acute infection and compares lengths of stay (LOS) as a correlate of glycemic control.
Methods:
Patients with type 2 diabetes (N=73), within a 200-bed facility treated for systemic infections (N=16) and receiving basal insulin were randomly selected from April 2022 to September 2022 from units where the patient to nursing ratio was 5:1/days and 6:1/nights. Patients were assigned to the controlled group if random BG mean was less than 180 mg/dL throughout stay; all others became the non-controlled group. TBG levels, infection type/medication, LOS, and demographics were collected. Minimum, maximum, and mean BG levels and LOS were calculated. A paired t-test (Î±=0.05) compared the difference in LOS between groups.
Results:
Patientsâ€™ (N=69) mean BG levels were calculated and assigned to controlled (N=30) or non-controlled (N=39) for their designated infection. Four patients were excluded due to a lack of comparator. LOS data for all infections ranged from 3 to 27 (mean, 7.48 days). BG levels ranged from 52 to 587 (mean, 189.9 mg/dL). Mean age of all patients was 64.2 years old (55% male). Cellulitis (N=12; 17%), CAP (N=10; 14%), and complicated UTI (N=9; 13%) were the most common infections. When comparing the LOS across all infections for controlled vs non-controlled, [p=0.12].
Discussion:
Study results displayed no statistical significance in LOS when comparing controlled and non-controlled BG groups. However, 8 of the 12 included infections showed a shorter LOS in the controlled group (34% mean reduction). The correlate outcome measure evaluated in this study may have been impacted due to patient specific factors like home BG control, home medications, and documented severity of infection. More research is necessary to find if patients with certain infections benefit more from having controlled BG levels.
Learning Objectives:
Identify the harms of hyperglycemic events in hospitalized patients
Discuss proper glycemic goals for hospitalized patients with type 2 diabetes and factors that increase their risk of a hyperglycemic episode
Self Assessment Questions:
Which of the following can occur due to severe hyperglycemic events?
A. Increased Infection Rate
B. Increased Length of Stay
C. Increased Mortality
D. All of the Above
Which of the following can put a hospitalized patient at a higher risk of experiencing a hyperglycemic episode?
A. Concurrent use of a steroid
B. A basal and bolus insulin regimen
C. Controlled BG prior to admission
D. Both A and C
Q1 Answer: D Q2 Answer: A

Blood loss during Impella 5 or 5.5 insertion and its correlation with heparin bolus dose
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Purpose: The purpose of this study is to determine an optimal heparin dose for ImpellaÂ® 5.0 or 5.5 insertion that reduces blood loss and allows for timely initiation of systemic anticoagulation.
Methods: This is a retrospective, chart review study of consecutive patients with cardiogenic shock admitted to the heart failure service who received an ImpellaÂ® 5.0 or 5.5 from 2020 to 2022. Inclusion criteria consisted of patients 18 years and older that underwent an ImpellaÂ® 5.0 or 5.5 insertion as a bridge to heart transplant or durable left ventricular assist device at a single institution who were anticoagulated with heparin during the procedure and monitored using activated clotting time (ACT). The primary outcome of the study was the incidence of major bleeding post device insertion and its correlation to heparin bolus dose and ACT. Major bleeding was defined as a decrease in hemoglobin by > 2 g/dl.
Results: A total of 20 charts were reviewed and one patient was excluded due to use of alternative anticoagulation during the procedure. The majority of patients were males (89%) with an average age of 60 years. Nine of the patients had a drop in hemoglobin of >2 g/dl (47%), and those were associated with heparin bolus doses of greater than 9000 units, and average peak ACT of 315, with five patients needing a blood transfusion (26%). However, the majority of patients were started on systemic anticoagulation either the same day or the following day, and monitored closely using a lower, narrow range of partial thromboplastin time (PTT).
Conclusion: High doses of heparin bolus were strongly correlated with major bleeding during insertion of Impella.
Learning Objectives:
Identify the marker of a major bleed in this study, and the consequences from a lack of systemic anticoagulation for the Impella?
Describe how patientsâ€™ anticoagulation is monitored during the insertion process?
Self Assessment Questions:
What can delay the timely start of systemic anticoagulation in the study?
A. Drug unavailable

B. High heparin bolus dose
C. Clotting of Impella device
D. Patient refusal
Which of the following is an exclusion criteria for the study?
A. Patients with previous history of MI
B. Patients with history of cancer
C. Anticoagulated with agent other than heparin during procedure
D. Patients with autoimmune disease
Q1 Answer: B Q2 Answer: C

Temporary Conversion of Parenteral Brand Remodulin to Generic Treprostinil

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recommend that treprostinil dose adjustments and monitoring be coordinated under the care of a pulmonary hypertension specialist. Abrupt changes in dosing may result in patient harm. Generic treprostinil was FDA approved in 2019 and replaced brand Remodulin as the preferred formulary item on December 30, 2019 at Henry Ford Health. Generic drugs are considered pharmaceutical equivalence if the AUC is between 80-125 % of the brand. The purpose of this study is to evaluate the safety and efficacy of converting from parenteral Remodulin to generic treprostinil during hospitalization in patients with PAH.

Methods: This IRB-approved retrospective, quasi-experimental study includes adult patients on parenteral Remodulin at home admitted to Henry Ford Hospital between January 1, 2017 - December 31, 2022. Patients were excluded if discharged or expired within 48 hours, required dose adjustments, converted to oral PAH medication, or vulnerable patients. While inpatient, the pre-group will continue brand Remodulin and the post-group switched to generic treprostinil. The primary outcome is clinical deterioration within 72 hours after initiating a hospital supplied medication. Clinical deterioration is defined as one or more of the following: 10% decrease in mean arterial pressure, 20% increase in heart rate, or escalation of respiratory support from baseline. Secondary outcomes include rate of diarrhea, headache, nausea, vomiting, use of VTE and prostacyclin cost. This study will include 150 patients (75 pre & 75 post group). Nominal and categorical data will be analyzed with the Chi-square test or Fisherâ€™s Exact test.

Results & conclusion: Will be presented at Great Lakes Pharmacy Residency Conference.

Learning Objectives:
Describe the pharmaceutical equivalency range allowed between brand and generic medications Identify treprostinil (Remodulin) related adverse Identify treprostinil (Remodulin) related adverse effects
Self Assessment Questions:
Which one of these is not an adverse effect associated with treprostinil?
A. Headache
B. Nausea
C. Vomiting
D. Hypertension
What AUC range does a generic drug have to fall in to be considered pharmaceutically equivalent to the brand drug?
A. 10-45%
B. 95 -110%
C. 80-125%
D. 50-75%
Q1 Answer: D Q2 Answer: C

Factors Associated with Readmission in Patients with End Stage Renal Disease on Hemodialysis Discharged on Outpatient Parenteral Antimicrobial Therapyâ€¯

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treatment requires care coordination and follow-up monitoring to prevent treatment failure, catheter complications, adverse drug events and readmission. Patients with end-stage renal disease (ESRD) on hemodialysis (HD) are at increased risk for infections due to immune dysfunction in kidney disease, indwelling catheters and frequent hospital admissions. OPAT is an option to treat these patients. However, it is important to consider the potential risks and benefits of OPAT in this population since they have complex medical needs putting them at risk for adverse outcomes. This study aimed to characterize patients with ESRD on HD discharged on OPAT and identify factors associated with poor outcomes, including readmissions.â€¯

Methods:â€¯This was an IRBâ€“approved retrospective study of adult (â‰¥ 18 years old) patients with ESRD on HD who were discharged between January 2020 â€“ August 2022 with at least 1 week of OPAT with vancomycin, daptomycin, ertapenem, cefazolin, or cefepime. Patients were excluded if they were admitted on OPAT prior to admission or expired within 30 days of the initial OPAT discharge, incarcerated, or if the discharge was self-directed. To characterize patients with ESRD on HD discharged on OPAT, data collected included patient demographics, OPAT regimen, OPAT administration location, access type, follow-up monitoring and readmission information. To identify risk factors for readmission, patients who had an unplanned all-cause 30-day readmission were compared with those not readmitted. Other safety measures collected include transitions of care process measures and follow-up monitoring. Bivariate statistics were utilized to compare groups.
â€¯
Results and conclusions: Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify factors associated with an increased risk of infections in patients with ESRD on HD.

Describe challenges associated with OPAT in patients with ESRD on HD.

Self Assessment Questions:

Which of the following factors is associated with increased infection risk among patients with ESRD on HD?

A. Indwelling intravenous access
B. Infrequent hospital admission
C. Robust immune function
D. Few comorbid conditions

Which of the following is a unique barrier among patients with ESRD on HD discharged on OPAT?

A. Follow up laboratory monitoring
B. Unclear discharge OPAT regimen
C. Regimen selection to avoid IV access placement
D. Patient education

Q1 Answer: A Q2 Answer: C

Evaluation of Community-Acquired Pneumonia Treatment Transitions of Care in a Community Health System

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Introduction: The American Thoracic Society (ATS) and Infectious Diseases Society of America (IDSA) recommend five days of therapy with a beta-lactam and macrolide or fluoroquinolone for patients with non-severe community-acquired pneumonia (CAP) and no additional multidrug resistant risk factors. Vaughn and colleagues conducted a retrospective cohort study within 43 hospitals that primarily looked at the rate of excess antibiotic treatment duration for patients diagnosed with pneumonia. Excess was calculated as the actual duration minus the shortest expected duration (including clinical stability, pneumonia classification, and potential pathogen). This study found 67.8% of patients received excess antibiotics which stemmed mainly from excess duration at discharge. Discharge excess accounted for 92.3% of excess duration.

Methods: The primary objective of this study is to quantify transitions of care stewardship opportunities by examining the percentage of patients with greater than 7 days total of CAP antibiotic therapy. The secondary objectives are to characterize the mean inpatient and discharge antibiotic use as well as analyze the pattern of antibiotic prescribing based on therapeutic classes prescribed and de-escalation opportunities.

Patients will be enrolled in the study if they were hospitalized between July 2021 and June 2022. Inclusion criteria are patients at least 18 years old and less than 90 years old who have an ICD-10 based diagnosis of community-acquired pneumonia. Exclusion criteria are pregnancy or presence of viral infection. All information will be collected via a retrospective chart review. Data points to be collected include age, gender, race, insurance, procalcitonin, positive microbiology results, length of stay, inpatient antibiotic indication, therapeutic class and duration, discharge antibiotic therapeutic class and duration. Additionally, this project will collect antibiotic de-escalation metrics and patterns to better characterize appropriate antibiotic use and direct subsequent antimicrobial stewardship initiatives.

Results and discussion will be presented at the conference.

Learning Objectives:

Identify an appropriate drug regimen for patients diagnosed with community-acquired pneumonia.

Describe an appropriate antibiotic duration for patients diagnosed with community-acquired pneumonia.

Self Assessment Questions:

Which of the following drug regimens would be most appropriate to start in a patient who is hospitalized on the medical surgical floor with community acquired pneumonia with no additional multidrug-resistant risk factors or allergies?

A. ciprofloxacin 500 mg by mouth twice a day
B. ceftriaxone 1 g IV daily + azithromycin 500 mg IV daily
C. cefepime 2 g IV every 8 hours + vancomycin 15-20 mg/kg/dose
D. levofloxacin 500 mg IV every 12 hours + aztreonam 2 g IV every 8 hours

The patient has improved by day 3, and is discharged after their antibiotic doses that day. Which of the following discharge durations is most appropriate to complete treatment for community-acquired pneumonia?

A. 2 days
B. 4 days
C. 7 days
D. 11 days

Q1 Answer: B Q2 Answer: A

Efficacy Profile of Glucagon-Like Peptide (GLP-1) Agonists for Patients with Type 2 Diabetes Mellitus (T2DM) in a Safety Net Hospital

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loss, and cardiovascular benefit. GLP-1 agonists are recommended as first line agents for many patients, but have been used mainly as add-on therapy at our safety net institution due to cost and coverage. Use is expected to increase after recent addition to health system and Medicaid formularies. The purpose is to assess the impact of GLP-1 agonists on diabetes outcomes in our largely underinsured or uninsured patients to better guide future use.

This study is a retrospective chart review design. Prescription history for GLP-1 agonists filled between October 2021-March 2022 at health system pharmacies will be screened. Patients over 18 years old with T2DM is eligible for inclusion. Chart review will be done to identify when the patient was initiated on a GLP-1 agonist, regardless if that falls between the time frame. The initial GLP-1 agonist prescription will be the index prescription used to determine the follow-up timeframe. Exclusion criteria include those who completed less than 90 days of treatment, those without follow-up hemoglobin A1c or weight reading 3-6 months after the index prescription, and those with an undetermined start date. The primary outcomes are mean change in A1c percentage and mean change in weight measured in kilograms (kg) within 3-6 months of the index prescription. Secondary outcomes include percent change in total daily dose of insulin within 3-6 months and the number of patients who had de-escalation in diabetes medications. Patient demographics reported will include those with a history of atherosclerotic cardiovascular disease events and those with obesity at baseline. Safety measures will be reported as patients that discontinued GLP-1 agonists due to intolerance. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify patients that would have barriers to use GLP-1 agonist therapy
Recognize factors that can prevent patients from achieving weight loss

Self Assessment Questions:

Which of the following patients would not be a candidate for GLP-1 agonist therapy?

A. 135 kg patient with an A1c of 12% on insulin therapy and is reporting multiple hypoglycemic events a week
B. 100 kg patient with an A1c of 9.8% and history of recurrent pancreatitis
C. 70 kg patient with an A1c of 8.0% and a 10-year ASCVD score of 24%
D. 110 kg patient with an A1c of 14% reporting to have difficulty with portion control with meals

What are obstacles that may prevent patients from losing weight while on GLP-1 agonists?

A. Eating smaller portions now compared to what they were eating prior to starting a GLP-1 agonist
B. Adhering to a diet plan that limits sugary and fatty food intake
C. Taking 70 units of insulin glargine daily and 15 units of insulin lispro three times a day
D. Transitioning from taking liraglutide 1.2 mg daily to 1.8 mg daily

Q1 Answer: B Q2 Answer: C

SGLT2i and GLP-1 RA for Cardiovascular Risk Reduction in Patients with Type 2 Diabetes Mellitus and ASCVD

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Purpose: This study aimed to identify the effects of a best practice advisory (BPA) in the electronic health record (EHR) regarding prescribing of glucagon-like peptide-1 receptor agonists (GLP-1 RA) and sodium/glucose cotransporter-2 inhibitors (SGLT2i) in patients with type 2 diabetes mellitus (T2DM) and a history of cardiovascular disease (CVD).
Methods: This was a retrospective, single-center, cohort study. A BPA in the electronic medical record occurred when a patient with T2DM and CVD had an encounter with an interventional cardiologist. Messages were sent to the care team recommending initiation of a GLP-1 RA or SGLT2i. The primary objective was to assess whether there is a difference by prescriber (specialty versus primary care) in proportion of patients identified by the BPA who were started on an SGLT2i or GLP-1 RA. Secondary outcomes included quantity of related admissions, adverse events, rates and reasons for discontinuation of SGLT2i or GLP-1 RA, reasons for not starting one of these agents, and pharmacist referral rates.
Preliminary results:
Overall, relatively few patients identified by the BPA were prescribed a SGLT2i or GLP-1 RA. The reason for not initiating one of these agents was rarely documented in the chart. Further analysis is needed, but preliminary results suggest that adverse events, cautions, or contraindications were the most-commonly documented reason for not initiating one of these agents. Additionally, the average A1c was close to 7%, showing that many of these patients were near or at goal on their current regimens, which may deter medication changes in response to a BPA.
Conclusions: Preliminary results suggest that this BPA was effective at identifying patients with T2DM and a history of ASCVD who may benefit from GLP-1 RA or SGLT2i therapy; however, uptake of these recommendations was limited, which will be further explored during data analysis.

Learning Objectives:
Identify which GLP-1 RA and SGLT2i have shown benefits for cardiovascular risk reduction.
Describe the effects a BPA alert in the EHR had on GLP-1 RA and SGLT2i prescribing in patients with T2DM and a history of CVD.
Self Assessment Questions:
Which once-daily medication was shown in clinical trials to significantly reduce the risk of the composite endpoint of death from cardiovascular causes, nonfatal myocardial infarction, and/or nonfatal stroke?
A. dulaglutide (Trulicity) injection
B. liraglutide (Victoza) injection
C. semaglutide (Ozempic) injection
D. semaglutide (Rybelsus) tablet
Which of the following of the outcomes were observed regarding the population identified by the BPA?
A. Most patients had uncontrolled diabetes with A1c >8%
B. Most patients had a PharmD listed on their care team.
C. Most of the patients were overweight or obese.
D. More than 50% of the patients were started on an SGLT2i or GLP-1 RA.
Q1 Answer: B Q2 Answer: C

Single Strength Sulfamethoxazole-Trimethoprim Provides Sufficient Prophylaxis Against Pneumocystis Jirovecii Pneumonia in Lung Transplant Recipients

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Purpose: To determine whether our lung transplant program's protocol using single strength (SS) sulfamethoxazole-trimethoprim (SMX-TMP) for prophylaxis in recipients prevents Pneumocystis jirovecii pneumonia (PJP), while allowing a high adherence rate and minimal side effects.

Methods: This is a retrospective, single-center observational study of lung transplant recipients transplanted between May 2002 and December 2021, and started on our SS SMX-TMP protocol for PJP prophylaxis. The primary outcome is to determine incidence of PJP any time posttransplant. The secondary outcome is to determine adherence rates for SS SMX-TMP at 1 year post-transplant. Patients were excluded if they received treatment dose SMX-TMP for Nocardia.

Results: 826 patients met the inclusion criteria. 702 (85.0%) patients were on SS SMX-TMP thrice weekly (or equivalent dose adjusted for renal function). 87 (10.5%) patients received SS SMX-TMP daily due to need for desensitization (65.5%) or Toxoplasma IgG seronegative recipient with a seropositive donor (29.9%). 2 (0.2%) patients developed PJP after transplant. Both patients were transplanted more than 1 year prior diagnosis, and neither were on SMX-TMP at the time of diagnosis. At 1 year post-transplant, 37/826 (4.5%) patients were on an alternative regimen.

Conclusions: Only 2 out of 826 (0.2%) patients developed PJP after transplant, and neither were on SMX-TMP at the time of diagnosis. None of the patients on SS SMX-TMP failed prophylaxis. There is very little published data about PJP prophylaxis in lung transplant patients, and this is the largest cohort to date to show that SS SMX-TMP is effective for prophylaxis. Our hypothesis is that SS SMX-TMP regimen is better tolerated than DS and has less side effects. Using SS SMX-TMP may allow more patients to tolerate a low cost medication (compared to expensive alternatives) for PJP prophylaxis with minimal side effects and higher adherence.
Learning Objectives:

Identify guideline recommended regimens for PJP prophylaxis.Â
Recall side effects of sulfamethoxazole-trimethoprim.Â
Self Assessment Questions:
Which of the following is not recommended for PJP prophylaxis in solid organ transplant recipients?
A. Sulfamethoxazole-trimethoprim DS MWF
B. Sulfamethoxazole-trimethoprim SS MWF
C. Sulfamethoxazole-trimethoprim SS daily
D. Pentamidine 300 mg monthly
Which of the following is a side effect of sulfamethoxazole-trimethoprim?
A. Hypernatremia
B. Constipation
C. Hyperkalemia
D. Hypokalemia
Q1 Answer: B Q2 Answer: C

Treatment of ESBL-associated cystitis and pyelonephritis (carbapenem vs. non-carbapenem beta-lactams)
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Purpose: Carbapenems are the drug-of-choice for treatment of bacterial infections with organisms producing extended spectrum beta-lactamases (ESBL) according to the Infectious Diseases Society of America guidelines. Recent data, however, suggests non-carbapenem beta-lactams obtain high concentrations in urine that may allow their use for the treatment of ESBL-associated urinary tract infections. The purpose of this study is to evaluate the use of non-carbapenem beta-lactams compared to carbapenem therapy for treatment of ESBL associated cystitis and pyelonephritis.

Methods: This was a retrospective, system wide cohort study of adults hospitalized at an IU Health hospital between 07/01/2019 and 06/30/2022. Patients were included if they received at least 48 hours of meropenem, amoxicillin/clavulanate, cefepime, or piperacillin/tazobactam, had a urine culture positive for the presence of an ESBL-producing organism, and were diagnosed with a UTI. Those included were divided into groups based on primary treatment with a non-carbapenem beta-lactam or carbapenem. Patients were excluded if they were identified as having an infection outside of the urinary tract (including bacteremia), received antimicrobials for purposes other than the treatment of a urinary tract infection (including surgical prophylaxis), were admitted with antibiotic regimens continued through the stay or received oxychlorosene bladder irrigations. The primary endpoint was readmission within 30 days for treatment of UTI due to the same organism. Key secondary endpoints included (but are not limited to) readmission within 90 days for treatment of a UTI due to the same organism, secondary infection with MDR or CRE organisms at 30 and 90 days, all-cause mortality at 30 and 90 days, length of stay, and overall duration of antibiotics.

Results and conclusion: Data collection and analysis are currently in progress. Results will be presented at the 2023 Great Lakes Pharmacy Residency Conference.
Learning Objectives:
Recall the class of antibiotics that is the treatment of choice for ESBL infections.
Explain the reasoning behind why non-carbapenem antibiotics are used in UTIs.
Self Assessment Questions:
What class of antibiotics is the treatment of choice for ESBL infections?
A. Aminopenicillins
B. Fourth-generation cephalosporins
C. Carbapenems
D. Monobactams
Why is it believed that non-carbapenem beta-lactams may be treatment options in ESBL UTIs?
A. Lower bacterial inoculum in UTIs
B. Urine cultures are often contaminated with more resistant organisms
C. Patients can tolerate higher doses of drugs when being treated for UTIs
D. Higher drug concentrations can be achieved in the urinary tract than in other areas
Q1 Answer: C Q2 Answer: D

Evaluation of the Efficacy and Safety of Rabbit Anti-Thymocyte Globulin Compared to Corticosteroid Induction in Adult Liver Transplant Recipients
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Purpose: The primary purpose of this study is to assess any differences in outcomes for liver transplant patients receiving corticosteroid compared to rabbit anti-thymocyte globulin (rATG) induction. The current guidelines suggest the use of either agent with no consistent practice among transplant centers. These findings can guide induction therapy and help standardize treatment for liver transplant recipients. The hypothesis of this study is that there are not significant differences in graft survival or rejection between the rATG and corticosteroid induction groups.
Methods: This investigation was a single-center retrospective cohort study including adult liver transplant recipients at IU Health University Hospital from January 1, 2018 - January 1, 2022, that received either corticosteroid or rATG induction. Patients who received a living donor transplant, multivisceral transplant, re-transplant, alternative induction agents, or survived less than 72 hours post-transplant were excluded. The primary endpoint of this study was the composite incidence of biopsy-confirmed acute rejection (BCAR), antibody-mediated rejection (AMR), graft failure, or death from any cause within 12 months following liver transplantation. Secondary endpoints include the individual components of the composite plus incidence of opportunistic infections, ICU length of stay, the total length of stay, and readmissions within 12 months post-transplant. Additional patient data including age, race, gender, MELD-Na score, indication for transplant, rATG dose, donor type, white blood cell and platelet counts, serum creatinine, the incidence of COVID-19, concomitant maintenance immunosuppression and tacrolimus levels will be obtained from institutional electronic medical records.

Results: Data collection and results are currently in process. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:
Identify current standard of care induction immunosuppression therapies following liver transplantation.
Discuss customized immunosuppression regimens considering risks and benefits of available therapeutic options.
Self Assessment Questions:
Which of the following is a preferred induction therapy agent among liver transplant recipients?
A. Basiliximab
B. Rituximab
C. Methylprednisolone
D. Alemtuzumab
JD is a 36-year-old African American female with end stage liver disease and autoimmune hepatitis, who received a positive crossmatch deceased donor liver transplant. The transplant team is planning to use rATG induction. Which patient specific factors would have been considered when selecting an induction regimen?
A. Age
B. Autoimmune indication for transplant
C. Positive crossmatch with the donor
D. All of the above
Q1 Answer: C Q2 Answer: D

Clinical Utility of MRSA Nasal Surveillance Screening in Critically Ill Patients: Impact of timing and effect of anti-MRSA antibiotics

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Methicillin-resistant Staphylococcus aureus (MRSA) pneumonia is associated with increased hospital mortality, 28-day mortality, and mechanical ventilation days compared to other intensive care unit (ICU) infections. Current evidence evaluating MRSA surveillance screening as a tool to predict MRSA pneumonia may not be generalizable to critically ill patients and the sustainability of surveillance screening over time or antibiotic exposure has not been previously explored. This study aimed to further evaluate the diagnostic performance characteristics (DPC) of nasal MRSA surveillance screening for the prediction of MRSA pneumonia in a critically ill patient population.

This single-center, retrospective study included patients admitted to the University of Cincinnati Medical Center from January 2013 to September 2022. Patients admitted to any of the adult ICUs or medical stepdown unit who had a respiratory culture and MRSA nasal swab obtained up to 30 days prior to respiratory culture result were included. Exclusion criteria included pregnancy, incarceration, and receipt of MRSA decolonization within 5 days of MRSA nasal swab.

The primary objective describes nasal MRSA surveillance screening DPC for MRSA pneumonia in critically ill patients. Secondary endpoints include MRSA surveillance screening DPC at time cohorts (<24 hours, 25-48 hours, 3-7 days, 8-14 days, and 15-30 days). Anti-MRSA antibiotic exposure time cohorts, including no exposure, <48 hours, 3-7 days, 8-14 days, or >14 days will be described. Primary and secondary outcomes will be compared using DPC of nasal MRSA swabs. Baseline demographics will be compared utilizing chi squared and t-test as appropriate. Multivariate regression analysis will identify risk factors for discordant screening results and positive MRSA respiratory culture. Time to nosocomial MRSA colonization in patients with sequential surveillance screening during hospital admission will be explored.

Data collection and statistical analysis is ongoing. Results will be presented at Great Lakes Pharmacy Resident Conference.

Conclusions will be forthcoming based on results.

Learning Objectives:

Recognize the clinical utility of MRSA nasal polymerase chain reaction (PCR) assays to alter therapy for pneumonia management.
Describe the clinical impact that MRSA nasal results will have on management of ICU patients with MRSA pneumonia.

Self Assessment Questions:

Which of the following is false?

A. The negative predictive value of MRSA nasal swabs has been shown to be 99.2-99.4%
B. Negative MRSA nasal swab increases the probability that the infection is due to MRSA
C. MRSA surveillance studies are highly dependent on the local prevalence of MRSA
D. MRSA nasal swabs can be a useful tool for reducing unwarranted anti-MRSA antibiotics

Which of the following is correct regarding MRSA nasal swabs in ICU patients?

A. MRSA nasal swabs have shown a low sensitivity, 40.3%, in ruling out ventilator-associated pneumonia
B. MRSA nasal swab results can be extrapolated for antibiotic de-escalation up to 45 days from collection
C. MRSA nasal swabs are equally predictive of MRSA associated CAP vs HAP vs VAP
D. MRSA nasal swab results are not impacted by the presence of anti-MRSA antibiotics

Q1 Answer: B Q2 Answer: A

Assessing the impact of primary care pharmacists to overcome therapeutic inertia when initiating and titrating sodium-glucose cotransporter 2 inhibitors (SGLT2i) and glucagon-like peptide-1 receptor agonists (GLP-1 RAs)

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Purpose: Type 2 Diabetes Mellitus (T2DM) is a progressive disease that requires frequent monitoring and intervention to meet and maintain glycemic goals. Recently, the American Diabetes Association clinical guidelines strengthened their recommendations for the use of glucagon-like peptide-1 receptor agonists (GLP-1 RAs) and sodium-glucose cotransporter 2 inhibitors (SGLT2is) for cardiovascular and renal protection. Patient, provider, and health system related factors impact successful utilization of these agents despite the abundant evidence showing their benefits. The purpose of this project is to evaluate the impact of a primary care pharmacist on initiating and titrating these agents in patients with T2DM and to refine pharmacist workflow following provider consultation.

Methods: A randomized retrospective analysis of 200 adult patients with T2DM newly prescribed a GLP-1 RA or SGLT2i between July 1, 2021 and December 31, 2021 was conducted. Half of the patients were managed solely by a primary care provider and half had pharmacist involvement. Chart review was completed from initial prescription through a six month follow up period. This data will be used to leverage consensus on improving pharmacist workflow following provider consultation. A survey was created to determine satisfaction with pre- and post- workflow changes.

Results: The pharmacist group had a 13% greater success rate at initiating the agent compared to conventional care (OR 1.75 (1.00-3.05); $p<0.05$). The pharmacist group had 212 total interventions at initial prescribing which included the completion of medication reconciliations, new medication teachings, de-intensifying therapies and addressing financial concerns. There was a decrease in hemoglobin A1c by 0.9% in the pharmacist group compared to 0.5% in the conventional group ($p=0.091$).

Conclusion: Pharmacist involvement increased the rate of successful initiation of SGLT2is and GLP-1 RAs in patients with T2DM compared to conventional care and resulted in greater A1c reductions. Workflow refinement is ongoing.

Learning Objectives:

Define therapeutic inertia and discuss factors that contribute to it.

Recognize the impact of a pharmacist assisting in initiating and titrating SGLT2is and GLP-1 RAs in patient with type 2 diabetes mellitus.

Self Assessment Questions:

What is the most important factor for therapeutic inertia as identified by the American Diabetes Association?

A. Patient related risk factors
B. Provider related risk factors
C. Health system related risk factors
D. All equally as important

What was the most common patient related risk factor for therapeutic inertia addressed by the pharmacist group?

A. Cost/financial concerns
B. Social determinants of health (ex. translator, transportation)
C. Denial of disease or lack of disease awareness
D. All addressed equally

Q1 Answer: D Q2 Answer: A

Is the Reversal of Oral Anticoagulants Necessary in Minor Traumatic Brain Injuries?

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Purpose: Falls are the leading cause of injury in adults 65 years and older, with traumatic brain injury (TBI) being a common adverse event. In severe TBIs, it is expected that patients receive anticoagulation reversal, however, guidelines are unclear whether reversal is necessary in minor TBIs. This study compared outcomes among patients with minor TBIs on anticoagulation who receive reversal versus those who were not reversed.

Methods: This retrospective, non-inferiority cohort study utilized data accessed from the Michigan Trauma Quality Improvement Program (MTQIP) database from 2018 to 2021. Patients were excluded with a Glasgow coma scale (GCS) < 13, non-blunt type trauma, abbreviated injury scale (AIS) > 2 outside of the head, transfer from another institution, and on a P2Y12 inhibitor. The primary outcome of interest included in-hospital mortality and/or hospice. Secondary outcomes assessed were intensive care unit (ICU) and hospital length of stay and a composite in-hospital complications. Patient characteristics were evaluated using Chi-squared tests or Fisher exact tests for categorical variables. T-tests or Mann-Whitney tests will be used for continuous variables. Tests of binary variables utilized weighted chi-square tests, and time-to-event outcomes were assessed using weighted Kaplan-Meier curves and log rank tests.

Results: Within the 1051 patients on anticoagulation that were analyzed, 646 were reversed and 405 were not reversed. The reversed group was more likely to be discharged dead or to hospice, 9.44% versus 4.69% ($p=0.007$). The hospital length of stay was greater in the reversed group, 5.07 vs. 4.34 days ($p<0.001$). The ICU length of stay was also greater in the reversed group, 2.96 days vs. 2.48 days ($p<0.001$).

Conclusion: In patients on oral anticoagulation presenting with a minor TBI, reversal does not reduce mortality and/or hospital/ICU length of stay.

Learning Objectives:

Review the current literature pertaining to emergent reversal of oral anticoagulation in traumatic brain injuries.

Discuss and compare mortality/hospice rates, length of hospital/ICU stay, and in-hospital complications following reversal in anticoagulated patients versus patients who did not receive reversal.

Self Assessment Questions:

Which of the following Glasgow coma scale (GCS) scores potentially indicate a minor traumatic brain injury?
A. GCS 7
B. GCS 9
C. GCS 11
D. GCS 13
According to the ACC guidelines, what is/are the factor(s) that determine whether reversal of anticoagulation is definitively necessary?
A. A major bleed that involves hemodynamic stability
B. A drop in hemoglobin 2 g/dL or greater
C. Requiring 2 or more units of red blood cell transfusion
D. All the above
Q1 Answer: D Q2 Answer: D

Efficacy and Safety of Dapagliflozin in Hospitalized Patients with Acute Heart Failure

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Purpose: Sodium-glucose co-transporter 2 (SGLT2) inhibitors have been shown to decrease cardiovascular mortality and heart failure hospitalizations in patients with chronic heart failure, regardless of ejection fraction. The effects of using SGLT2 inhibitors in hospitalized patients with acute heart failure (AHF) are unclear, and existing clinical data is limited to empagliflozin with inconsistent outcomes. This study aimed to evaluate the efficacy and safety of using dapagliflozin in hospitalized patients with AHF by comparing the incidence of worsening heart failure in patients who received dapagliflozin while hospitalized for AHF to those who did not.

Methods: This was a retrospective, multicenter, cohort study that included patients admitted to University of Louisville Hospital and Jewish Hospital between August 1, 2021 and August 1, 2022. Patients hospitalized with AHF and who received at least 24 hours of intravenous loop diuretics were included for analysis. The two arms of the study consisted of patients who received dapagliflozin within 72 hours of hospitalization and those who did not, and a subgroup analysis of outcomes was performed in patients admitted to the intensive care unit (ICU) compared to patients not admitted to the ICU. The primary efficacy outcome was the incidence of worsening heart failure defined as any one of the following: increase in diuretic intensity or dosing, initiation or dosing increase of IV inotropic therapy, or the need for mechanical intervention for AHF. The primary safety outcomes were the incidence of renal dysfunction and the incidence of hypotension. Secondary outcomes included the cumulative diuretic requirements during hospitalization, hospital length of stay, and all-cause mortality.

Data collection is ongoing. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss guideline recommendations for using sodium-glucose co-transporter 2 (SGLT2) inhibitors in chronic and acute heart failure
Identify the potential benefits of using dapagliflozin in hospitalized patients with acute heart failure

Self Assessment Questions:

1. Which of the following agents have demonstrated a reduction in cardiovascular mortality in patients with chronic heart failure, regardless of ejection fraction?
A. Furosemide
B. Dapagliflozin
C. Sacubitril/valsartan
D. Metoprolol
Which of the following is a potential benefit of using SGLT-2 inhibitors in patients with acute heart failure?
A. Reduction in loop diuretic dosing
B. Increase in cardiac output
C. Hypotension
D. Decrease in in-hospital mortality
Q1 Answer: B Q2 Answer: A

Risk Factors for Adverse Effects of Vasoactive Medications for Augmented MAP Management after Spinal Cord InjuryÂ

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Congress of Neurological Surgeons (2013) recommend augmentation of blood pressure to maintain a mean arterial pressure (MAP) between 85 - 90 mmHg for a total of seven days after injury. This recommendation is supported by studies that concluded a higher MAP threshold and avoidance of hypotension may be associated with a greater degree of neurologic recovery. Vasopressors are often used for MAP augmentation but, limited data exists on which patients may develop adverse effects due to their usage. The primary purpose of this study is to identify risk factors associated with experiencing an adverse effect after receiving a vasoactive infusion in patients with an acute SCI treated with augmented MAP therapy.
Methods: This is a single center retrospective cohort study with data gathered of patients admitted from January 1st of 2010 through January 1st of 2022. The primary outcome for this study is identification of risk factors for the incidence of any related adverse event in patients started on vasopressor medications to augment MAP. Adverse events include myocardial infarction, arrhythmias, ischemic stroke, and limb ischemia. Secondary outcomes include identification of risk factors for experiencing an individualized adverse event. Patients included in the study must have experienced an acute SCI, be â‰¥ 18 years of age at the time of admission, have a targeted MAP goal â‰¥ 85 mmHg, admitted to the intensive care unit, and received vasopressor administration for > 24 hours. Patients excluded were those known to be pregnant and those who opted for hospice. This study utilized a logistic regression model for analysis.
Conclusion: Data collection and analysis are currently in progress. Results will be presented at the 2023 Great Lakes Pharmacy Residency conference.

Learning Objectives:

Describe current guideline recommendations for blood pressure goals in the treatment of acute spinal cord injury.
Identify potential adverse effects associated with administration of vasopressors.

Self Assessment Questions:

Which of the following is the American College of Surgeons (2022) and The American Association of Neurological Surgeons and Congress of Neurological Surgeons (2013) guideline recommended MAP target range for 7 days after an acute SCI?

A. <65 mmHg
B. 65 - < 85 mmHg
C. 85 - 90 mmHg
D. >90 mmHg

Which of the following is a documented potential adverse effect of vasoactive medications?

A. Hypotension
B. Hypoglycemia
C. Coagulopathy
D. Tachyarrhythmia

Q1 Answer: C Q2 Answer: D

Unfractionated Heparin Monotherapy versus Unfractionated Heparin and Bivalirudin in Patients with Non ST-segment Elevation Myocardial Infarction or Unstable Angina Undergoing Percutaneous Coronary Intervention: a retrospective study

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Purpose: Many Americans diagnosed with acute coronary syndrome (ACS) are hospitalized for non ST-segment elevation myocardial infarction (NSTEMI) or unstable angina (UA). Those patients typically undergo cardiac catheterization for primary percutaneous coronary intervention (PCI). Prior to and during PCI, current ACC/AHA guidelines recommend the use of either bivalirudin or unfractionated heparin as the anticoagulant of choice. Current Bronson Methodist Hospital (BMH) protocol recommends unfractionated heparin as its first line therapy for patients with NSTEMI or UA undergoing PCI. Bivalirudin is also on formulary at BMH and is sometimes utilized by interventional cardiologists after a heparin drip has been started if activated clotting time (ACT) is not in therapeutic range. The objective of this study is to compare the safety and efficacy of unfractionated heparin monotherapy versus unfractionated heparin and bivalirudin in patients presenting to BMH with a NSTEMI or UA undergoing PCI.

Methods: This was a retrospective chart review of patients with ACS experiencing a NSTEMI or UA who received either unfractionated heparin alone or unfractionated heparin and bivalirudin during primary PCI at Bronson Methodist Hospital. The primary outcome of this study was a composite of major and minor bleeding events at 72 hours. Patients with NSTEMI/UA who underwent a PCI procedure were divided into two cohorts â€“ patients who received unfractionated heparin alone and patients who received both unfractionated heparin and bivalirudin.

Results/conclusion: Data analysis is currently being performed. Results and conclusions will be presented at the 2023 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss current literature analyzing the safety and efficacy of antithrombotic therapies for patients undergoing PCI
Identify potential medication-related risk factors for increased bleed potential in patients post-PCI procedure

Self Assessment Questions:

Based on the results of the VALIDATE-SWEDEHEART trial, what did the authors conclude as their reasoning for similar outcomes of incidence of

A. Radial access

B. Lower rate of glycoprotein IIb/IIIa inhibitor use
C. Lower ACT target goal for heparin therapy
D. A and B
What is the target ACT goal recommended by the 2021 ACC/AHA/SCAI guidelines for unfractionated heparin during PCI?
A. 200 â€“ 250 seconds
B. 250 â€“ 300 seconds
C. 300 â€“ 350 seconds
D. 350 â€“ 400 seconds
Q1 Answer: D Q2 Answer: B

Use of Alternatives to Opioids to Control Vaso-Occlusive Crisis in Patients Admitted to UI Health

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Purpose:
Opioids are often required to control pain. Use of alternatives to opioids (ALTOs) such as ketamine or lidocaine infusions is important in populations with high levels of pain, namely sickle cell disease patients (SCD) admitted for vaso-occlusive crisis (VOC). During acute pain, glutamatergic N-methyl-D-aspartate (NMDA) receptors are upregulated leading to refractory pain, making treatment options difficult. Alternatives like these ALTOs have demonstrated benefits in VOC while lowering opioid requirements. At UI Health, these ALTOs for pain management are available by consulting the Chronic Pain Service Consult. Use of these ALTOs is protocolized for some populations but not all, including VOC patients.

In a single-center retrospective cohort study in Chicago, IL, Zavala et al. analyzed the use of protocol-driven ketamine and lidocaine infusion therapies for VOC in 17% of patients and determined that both agents are effective in reducing opioid consumption for VOC patients. A cursory review of UI Health hospital admissions revealed 330 inpatient sickle cell service admissions over a 6-month period. Ketamine infusions were ordered for 25 patients and a smaller proportion had lidocaine infusions for pain, suggesting roughly 8% of patients admitted for SCD receive ALTOs during UI Health admission. Given the benefits of ALTOs and potential low utilization compared to hospitals in the same geographic area, the purpose of this study is to evaluate and characterize the use of ketamine and lidocaine infusions in patients admitted for VOC at UI Health.

Methods:
Patient lists will be obtained from UI Healthâ€™s EHR, via SlicerDicer. Data will be collected and stored using REDCap. Statistical analyses will be assessed using descriptive and inferential statistics. We will be conducting a grouped analysis (any ALTO) on the primary outcome as well as reporting individual orders (ketamine, lidocaine). Analysis will be performed using SPSS.

Results:
In progress

Conclusions:
In progress

Learning Objectives:
Identify the amount of ketamine and lidocaine usage within a year at UI Health.
Review some of the mechanisms of pain relief through ALTO use.

Self Assessment Questions:
At UI Health, what proportion of patients with VOC received ketamine or lidocaine infusions for pain over one year?
A. <20%
B. 20-40%
C. 40-60%
D. >60%
Which of the following statements are CORRECT?
A. Ketamine works to alleviate pain via NMDA receptor agonism
B. Ketamine works to alleviate pain via NMDA receptor antagonism
C. Lidocaine works to alleviate pain by increasing neuronal impulses
D. Lidocaine works to alleviate pain by activating sodium ion channels
Q1 Answer: A Q2 Answer: B

Evaluating the Use of Dalbavancin to Reduce Hospital Admissions and Inpatient Days of Therapy for Acute Bacterial Skin and Skin Structure Infections

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Purpose: Acute bacterial skin and skin structure infections (ABSSSI) are a complicated medical problem often associated with high direct and indirect medical costs. Administration of intravenous (IV) antibiotics is the sole reason for nearly half of ABSSSI hospital admissions. Dalbavancin is one of a new class of antibiotics that may decrease hospitalizations and reduce overall costs. The purpose of this study is to assess the impact of a multi-pronged dalbavancin program on ABSSSI-related hospital admissions. Methods: This study included a single-center, retrospective chart review of inpatients with Diagnosis Related Groups (DRG) 602 and 603 (cellulitis with and without major complication or comorbidity, respectively) in a community hospital from January to June 2022 followed by prospective data analysis from July to October 2022. The primary outcome was inpatient antibiotic use days. Secondary outcomes included number of admissions for these DRGs and infusions of dalbavancin. Patients excluded: patients less than 18 years or hospitalized for another infection. Prospective data analyzed use of dalbavancin after inclusion in the Pharmacy and Therapeutics approved ABSSSI decision tree. An infectious disease (ID) physician conducted a Continuing Medical Education program on appropriate use of dalbavancin in treating ABSSSI and subsequently to emergency room (ER) personnel. Concurrently, a pharmacy resident provided dalbavancin education to staff at the organizationâ€™s five ER facilities. Results: Dalbavancin was administered 67 times. Use in the ER prevented 10 admissions for DRG602/603. The average length of inpatient antibiotic use was 2 days in dalbavancin patients and 4.5 days for patients receiving other antibiotic therapies (p=0.020). Average length of stay was 1 day for dalbavancin patients and 4 days for patients receiving other antibiotics (p=0.012). Conclusion: Use of dalbavancin can help decrease the number of admissions for ABSSSI and decrease inpatient length of stay. Further evaluations with a larger sample size are warranted.

Learning Objectives:

Outline the current treatment approach for acute bacterial skin and skin structure infections
Discuss the benefits of dalbavancin antibiotic therapy

Self Assessment Questions:

Which of the following is classified as an acute bacterial skin and skin structure infection?
A. Cellulitis/erysipelas
B. Wound infections
C. Major cutaneous abscess
D. All of the above
What is the expected half-life of dalbavancin?
A. 12 hours
B. 1 day
C. 7 days
D. 14 days
Q1 Answer: D Q2 Answer: D

Dose-optimized Oral Î²-lactams as Step-down Therapy for Enterobacterales Bacteremia

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For many years, enterobacterales bacteremia has been treated with extended courses of intravenous (IV) antibiotics. Evidence has shown that IV treatment is not necessary for the entirety of therapy. Multiple studies support a â€œstep-down approachâ€ to oral therapy as a feasible and effective strategy after patients demonstrate an appropriate clinical response. Fluoroquinolones (FQ) and trimethoprim-sulfamethoxazole (SMX/TMP) are the current mainstays of definitive treatment. Growing evidence around fluoroquinolone use demonstrates increasing resistance rates. Given the safety concerns of FQs and SMX/TMP, the use of oral beta-lactams has been considered in recent clinical trials. Findings suggest similar mortality rates, but higher rates of recurrence. However, studies omitted optimized dosage of oral beta lactams to reach appropriate pharmacodynamic targets. The purpose of this study is to compare clinical outcomes of conventionally dosed beta lactams against optimally dosed beta lactams.

Methods

The Franciscan Alliance Institutional Review Board approved this study. The study was a retrospective, single-center chart review. Patients were included if: â‰¥ 18 years of age admitted to Franciscan Health, had urinary source bacteremia with positive urine and blood cultures with the same pathogen, and underwent oral stepdown therapy with susceptible oral beta-lactam or susceptible surrogate. Patients were excluded if they had complicated infection, were severely immunocompromised, received IV antibiotics for more than 5 days, had polymicrobial infection, recent bacteremia (12 months prior), or death during hospitalization. The primary endpoint was treatment failure, including 90-day mortality, recurrent bacteremia with the same organism, transition back to intravenous antibiotics, and ICU admission. Secondary endpoints included transition back to intravenous antibiotics during initial treatment course, occurrence of c. difficile infection within 90 days of completion of oral antibiotics, and adverse reactions.

Results

Results to be presented at the Great Lakes Pharmacy Resident Conference.â€¯

Learning Objectives:
Recall Recall the important pharmacokinetic/pharmacodynamic parameters to consider when dosing beta-lactams.
Discuss Discuss the advantages and disadvantages of oral beta-lactams.
Self Assessment Questions:
Which of the following is true about oral beta-lactam dosing?
A. They are all classified as low bioavailability agents
B. They exhibit concentration-dependent killing
C. They exhibit time-dependent killing
D. It is recommended that free drug concentration remain below the MIC
Which of the following is an advantage of oral beta-lactams over fluoroquinolones?â€¯
A. Preferred safety profileâ€¯
B. Increased risk of resistance
C. Reduced absorption
D. Increased risk of treatment failure
Q1 Answer: C Q2 Answer: A

Assessing the appropriateness of antibiotic selection and therapy duration in the management of urinary tract infections (UTIs) in a community hospital setting
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resistance. This may reduce effectiveness of future antibiotic treatments. While UTI treatment guidelines have not been updated since 2011, new information is available. The purpose of this study is to evaluate pharmacistsâ€™ impact on evidence-based treatment of UTIs in a community hospital setting. Methods: This was a single center, retrospective chart review, and prospective data analysis of patients in a community hospital setting with a diagnosis of UTI from April to September 2022. The retrospective review focused on initial antibiotic selection and duration. The prospective analysis focused on pharmacist intervention. An updated decision tree and new order sets were distributed to pharmacists and prescribers. Data collection included demographics, antibiotic selection, indication and duration, and provider acceptance of pharmacist intervention(s). Interventions involved changes in therapy and addition of stop dates. Non-pregnant hospitalized patients over 18 years receiving antibiotic(s) for UTI were included. Primary outcomes were appropriate selection of initial antibiotic therapy and average duration of therapy. The secondary outcome was prescriber acceptance rate of pharmacist interventions. Results: 122 patients met the inclusion criteria:70 pre-intervention and 52 post-intervention. Appropriate initial antibiotic selection increased from 81.4% to 92.3% (p=0.086). Appropriate culture-directed antibiotic selection increased from 77.1% to 92.2% (p=0.028). Inpatient duration of therapy was 2.6 days longer in the post intervention group. Post-discharge days of therapy remained unchanged. When pharmacists made recommendations, appropriate antibiotic selection increased by 6.9% (p=0.357). Overall, pharmacist interventions were accepted 95.8% of the time. Conclusion: After implementation of an updated UTI pathway, appropriate antibiotic selection and duration of therapy improved between study groups. This confirms that pharmacists can help optimize antibiotic treatment and durations of therapy in hospitalized patients with a diagnosis of UTI.
Learning Objectives:
Identify appropriate initial antibiotic selection and duration of therapy for hospitalized patients with a diagnosis of a UTI.
Describe the pharmacist role in antimicrobial stewardship.
Self Assessment Questions:
A 54-year-old female presents to the emergency room with a fever, back pain, and stating â€œI constantly have to urinateâ€The patient has no allergies. What is an appropriate antibiotic choice and duration of therapy to recommend?
A. Piperacillin-tazobactam 3.375 Gm IV Q8H x 7 days
B. Sulfamethoxazole-Trimethoprim 800-160 mg PO BID x 7 days
C. Nitrofurantoin 100 mg PO BID x 5 days
D. Ceftriaxone 1 Gm IV Q24H x 10 days
Select the correct statement about the pharmacist's role in antimicrobial stewardship.
A. Pharmacists are limited by the physician they are rounding with that day.
B. Pharmacists can make recommendations only on duration of therapy, but the antibiotic selection is determined by the provider.
C. Pharmacists utilize cultures and sensitivities to optimize antibiotic regimens.
D. Pharmacists are not allowed to make recommendations to providers.
Q1 Answer: B Q2 Answer: C

Real World Impact of Glucagon-Like Peptide-1 Receptor Agonists on Cost and Healthcare Resource Utilization from an Employerâ€™s Perspective
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Purpose:
The first glucagon-like peptide-1 receptor agonist (GLP-1) was FDA-approved in 2005 as an adjunct to diet and exercise to improve glycemic control in adults with type 2 diabetes mellitus (T2DM). Since then, several more GLP-1s have been FDA-approved and vary in administration, formulation, and indication. As of 2022, there are seven GLP-1s indicated for T2DM and two indicated for weight management. In addition, there is one glucose-dependent insulinotropic polypeptide (GIP) receptor and GLP-1 indicated in patients with T2DM. Recent utilization trends with this class have led to increases in pharmacy costs for both employers and employees. Prior to this study, there is limited data on the cost-effectiveness of GLP-1 products from an employerâ€™s perspective.

Methods:
This study is a retrospective cohort study. De-identified pharmacy and medical claims will be collected from an employerâ€™s claims database for all members who initiated a GLP-1 product between July 1, 2021, through March 31, 2022. Each member will be assigned an index date, indicating the first date they received a GLP-1 for the treatment of diabetes or weight-loss while covered under a pharmacy and medical plan. The time-periods assessed will be the twelve months pre-index and post-index date. The time leading up to the index date will be referred to as the â€œbaseline periodâ€and the time after the index date will be referred to as the â€œtreatment period.â€Healthcare resource utilization and cost captured in the time periods will be compared to each other. Patients will be assessed per their GLP-1 cohort (diabetes or weight loss).

Results/Conclusion:
Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:
Identify the role of GLP-1 products in the treatment of diabetes and obesity
Describe the clinical and financial impact of initiating a GLP-1 product in patients with diabetes and obesity from a payerâ€™s perspective

Self Assessment Questions:
Per the 2023 Standards of Care in Diabetes, select GLP-1 products may be appropriate first-line therapy for patients with type 2 diabetes and:
A. Atherosclerotic Cardiovascular Disease
B. Chronic Kidney Disease
C. Obesity
D. All of the above
Between 2021 and 2022 the average annual cost to a payer for a GLP-1 product used in for the treatment of obesity was approximately
A. 30000
B. 15000
C. 10000
D. 5000
Q1 Answer: D Q2 Answer: B

Effect of Computerized Glycemic Management Systems on Time to Resolution of Diabetic Ketoacidosis

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Title: Effect of Computerized Glycemic Management Systems on Time to Resolution of Diabetic Ketoacidosis
Purpose: Computerized glycemic management systems provide personalized insulin dosing recommendations for glycemic management in diabetic ketoacidosis (DKA). These systems are associated with shorter length of hospital stay, lower rates of hypoglycemia, and faster time to resolution of DKA. In April 2022, Baptist Health Louisville initiated a new DKA treatment protocol that replaced manual insulin infusions with computerized glycemic management systems. The purpose of this study is to compare the effect of computerized glycemic management systems versus manual insulin infusion protocols on time to resolution of DKA at Baptist Health Louisville.
Methods: This is a single-center, retrospective, pre-post intervention cohort study. Patients aged 18 years and older with a diagnosis of DKA based on ICD-10 code and documented administration of an insulin infusion were included. Pregnant patients and patients who did not meet pre-specified DKA diagnostic criteria were excluded. Patients included in the pre-intervention group were admitted from October 2021 to March 2022 and received manual insulin infusions per protocol. In contrast, patients included in the post-intervention group were admitted from May 2022 to October 2022 and received insulin infusions using a computerized glycemic management system. The primary outcome is time to resolution of diabetic ketoacidosis defined as serum glucose <200 mg/dL and at least two of the following criteria: serum bicarbonate >15 mEq/L, pH >7.3, or anion gap â‰¤12 mEq/L. Secondary outcomes include length of stay, adherence to fluid protocol, and frequency of hypoglycemic events. For the primary endpoint, achieving 80% power requires a sample size of 56 patients per group. Alpha will be set a priori at 0.05.
Results & Conclusions: Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:
Review the current treatment recommendations for diabetic ketoacidosis in adults
Define 2.Define computerized glycemic management systems and their role in glycemic control

Self Assessment Questions:

Diabetic ketoacidosis is BEST treated initially with which of the following therapies?

A. Subcutaneous insulin glargine and intravenous fluids
B. Subcutaneous insulin glargine
C. Intravenous insulin regular infusion and intravenous fluids
D. Intravenous insulin regular infusion

Computerized glycemic managements systems are best defined as?

A. Software that provides insulin dosing recommendations based on patient specific factors
B. Software that provides insulin dosing recommendations based on a sliding scale
C. Software that provides management of intravenous insulin only
D. Software that provides insulin dosing recommendations based on population data

Q1 Answer: C Q2 Answer: A

Two times vs four times daily cephalexin dosing for the treatment of uncomplicated UTI in females

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Background: Urinary tract infections (UTIs) are one of the most common indications for outpatient antibiotic prescribing, with millions of Americans diagnosed with UTI annually. The current Infectious Diseases Society of America (IDSA) treatment guidelines recommend beta-lactam antibiotics as an alternative, rather than first-line, for the treatment of uncomplicated UTI (uUTI); however, current national susceptibility trends, favorable safety profile, and more recent literature supporting the efficacy of beta-lactams may support their use as a first-line agent in many patients. Cephalexin is a commonly prescribed first-generation cephalosporin with excellent bioavailability and urinary penetration; however, little data exist to support optimal dosing for uUTI, with pharmacokinetic data supporting twice daily dosing, but package insert recommendations supporting four times daily dosing.

Purpose: The goal of this study is to compare treatment failure between patients treated for uUTI with cephalexin 500 mg twice daily versus 500 mg four times daily in the outpatient setting. Secondary objectives included comparing the rate of adverse events and Clostridioides difficile infections that occurred up to 30 days after completion of therapy.

Methods: This is a retrospective, multicenter, cohort study comparing adult female patients who received cephalexin for uUTI in the outpatient setting across Trinity Health Michigan sites between February 1, 2020, and August 31, 2022. Patients with a diagnosis of uUTI and documented uUTI symptoms of dysuria, suprapubic pressure, urinary frequency, or urinary urgency were eligible for inclusion. Cephalexin treatment must be for a planned duration of therapy between 5 and 7 days. Pregnancy, diagnosis of complicated UTI, presence of a urinary catheter, patients with history of recurrent UTI, and urine culture not susceptible to cephalexin will result in exclusion.

Results: Data collection and analysis are currently in progress.

Conclusion: To be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe current treatment recommendations from the Infectious Diseases Society of America (IDSA) for uncomplicated urinary tract infections (uUTI)â€‹ in women

Identify the potential benefits of decreased cephalexin dosing frequency in the treatment of uUTI

Self Assessment Questions:

According to current national guidelines, which of the following medication regimens is considered first-line treatment in uncomplicated UTI?

A. Nitrofurantoin 100 mg twice daily for 5 days
B. Ciprofloxacin 500 mg every 12 hours for 3 days
C. Cephalexin 500 mg every 6 hours for 5 days
D. Trimethoprim/Sulfamethoxazole 160/800 mg twice daily for 5 days

Which of the following is considered a benefit of decreasing cephalexin frequency in treatment of uncomplicated UTI?â€‹

A. Increased risk of adverse effects â€‹
B. Increased rate of adherence
C. Decreased duration of therapyâ€‹
D. Decreased efficacy in treatment outcomes

Q1 Answer: A Q2 Answer: B

Development and Implementation of an Inhaled Corticosteroid (ICS) De-Escalation Protocol for Patients with Chronic Obstructive Pulmonary Disease (COPD)

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The 2023 Global Initiative for Chronic Obstructive Lung Disease (GOLD) Report recommends long-acting bronchodilator therapy as the backbone of chronic obstructive pulmonary disease (COPD) treatment. The use of inhaled corticosteroids (ICS) is only strongly favored in patients with a history of hospitalization(s) for COPD exacerbations or two or more moderate exacerbations in the previous year, eosinophil count greater than 300 cells/uL, and/or a history of asthma. When patients are taking an ICS but the original indication was inappropriate, adverse effects such as pneumonia occur, or there is not an appropriate clinical response to the ICS, then the ICS should be withdrawn. De-escalating ICS therapy should be done slowly to decrease chances of worsening COPD control. Currently, Froedtert Health does not have data on internal rates of appropriate ICS use in COPD nor a protocol to assist with de-escalation. The goal of this project is to assess and optimize rates of appropriate ICS use for patients with COPD in concordance with the 2023 GOLD Report.

The primary objective is to evaluate appropriate ICS use in patients with COPD admitted for pneumonia. Secondary outcomes include evaluating the number of patients prescribed an ICS with one or more hospitalizations for pneumonia and/or two or more outpatient pneumonia events in the previous year, number of patients prescribed an ICS with a baseline blood eosinophil count of less than 100 cells/ÂµL, number of patients with a baseline blood eosinophil count recorded prior to initiating an ICS, and successful creation of an ICS de-escalation protocol.

The protocol will be readily available to clinicians and comprised of a suggested workflow for evaluating indications for ICS use, taper schedule, and appropriate follow-up after initiating de-escalation. With use of this protocol at key transitions of care, our goal is to reduce ICS-associated adverse effects while maintaining overall COPD control.

Learning Objectives:

Identify appropriate indications for inhaled corticosteroid use in patients with COPD

Describe strategies utilized for inhaled corticosteroid de-escalation in patients with COPD

Self Assessment Questions:

In which of the following situations is it most appropriate to initiate an inhaled corticosteroid for a patient with COPD already taking a long-acting bronchodilator?

A. Two hospitalizations for pneumonia infections in the previous 6 months
B. A blood eosinophil count of 87 cells/ÂµL and no COPD exacerbations in 3 years
C. One hospitalization for a COPD exacerbation in the last 12 months
D. One mild COPD exacerbation managed outpatient in the previous 2 years

What strategy should be utilized for inhaled corticosteroid de-escalation to prevent worsening of COPD control?

A. Rapid de-escalation by directly withdrawing ICS therapy
B. Gradual step-down approach by reducing ICS dose by 50% every 6 weeks
C. Step-down approach by reducing ICS dose by 50% every week
D. Never stop the ICS

Q1 Answer: C Q2 Answer: B

A Retrospective Review of 30-day Readmissions in Patients Taking Oral Anticoagulants at a Community Health System

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thromboembolism, non-valvular atrial fibrillation, and stroke prevention. Despite the high-risk nature of OACs, there are a limited number of studies investigating readmissions in various populations. In a 2017 retrospective analysis, authors found that from 500,000 patients on oral anticoagulants, approximately 14% were readmitted due to any cause. Another study found over 32% of anticoagulated patients were readmitted within 30 days of discharge. These studies indicate there is a population of patients that may benefit from additional interventions or monitoring. Within the Bronson Healthcare Organization, it is unclear if there are certain trends that makes patients more likely to be readmitted and if an intervention can be developed to better serve those at risk. The objective of this study is to assess the incidence of 30-day readmission encounters where patients were discharged on apixaban, rivaroxaban, and warfarin.

Methods: This is a retrospective chart review which will include patients who were treated with either apixaban, rivaroxaban, or warfarin for an approved indication at Bronson Healthcare Group. The primary outcome will compare the rates of readmission within 30 days of discharge in each group.

Results/conclusion: Data analysis is currently being performed. Results and conclusions will be presented at the 2023 Great Lakes Pharmacy Resident Conference.

Conflict of Interest statement: The speaker has no actual or potential conflict of interest in relation to this presentation.

Learning Objectives:

Outline appropriate oral anticoagulation choice based on patient characteristics.

Define the risk factors that increase hospital readmissions.

Self Assessment Questions:

Which of the following patients are most likely to be re-admitted within 30 days of a hospital discharge?

A. A 67-year-old man discharged after a motor vehicle accident
B. A 34-year-old female discharged after being treated for an asthma attack
C. A 55-year-old male discharged after being diagnosed and treated for new onset atrial fibrillation
D. A 59-year-old female discharged after experiencing a fall with loss of consciousness
According to the American College of Cardiologyâ€™s 2016 CHEST guidelines, which of the following oral anticoagulant is recommended for a patient with a creatinine clearance of 24 mL/min?
A. Warfarin
B. Apixaban
C. Rivaroxaban
D. Dabigatran
Q1 Answer: C Q2 Answer: A

Evaluation of a Systematic Process to Identify Patients with Lower Respiratory Tract Infections Eligible for Antimicrobial Stewardship Program Transitions of Care (ASP TOC) Interventions

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Purpose: The Centers for Disease Control and Prevention have identified discharge antimicrobial prescribing as an opportunity for improving antimicrobial stewardship. A 2018 study demonstrated a 46% improvement in discharge antibiotic regimens after implementation of an Antimicrobial Stewardship Transition of Care (ASP TOC) intervention. The intervention focused on pharmacist-led discharge antimicrobial prescribing for uncomplicated infections: pharmacists collaborated with providers and pended antibiotic discharge orders. One limitation in sustaining ASP TOC was difficulty identifying patients eligible for intervention. In October 2021, Henry Ford Health (HFH) implemented an electronic scoring system within the electronic health record to prioritize pharmacist workload and identify patients requiring interventions. The electronic scoring system, which includes variables with a prioritization-based tiered point system, is used as standard of care. In September 2022, an ASP TOC variable was implemented to identify patients with lower respiratory tract infections (LRTI) eligible for ASP TOC interventions. This variable allows inpatient pharmacists to target patients with LRTI being discharged on oral antibiotics to ensure appropriate selection and duration. The purpose of this study was to evaluate the electronic scoring system ASP TOC process and discharge prescribing for patients with LRTI.

Methods: This IRB-approved, retrospective, quasi-experimental study included patients discharged from HFH Detroit on oral antibiotics for LRTI from November 1, 2021, to February 28, 2022 (pre-intervention group) or November 1, 2022 to February 28, 2023 (post-intervention group). The primary endpoint was the proportion of optimized discharge antimicrobial regimens. A sample size of 194 patients was required to achieve 80% power and detect a 20% reduction of non-optimized therapy. Patients discharged on intravenous antibiotics were excluded. Studentâ€™s T-test or Mann-Whitney U test, and chi-square test were performed for comparisons of continuous data and nominal data, respectively. Multivariable logistic regression was used to identify factors associated with optimized regimens.

Results and conclusion will be presented.

Learning Objectives:

Describe the goals of antimicrobial stewardship through targeted discharge antimicrobial prescribing.
Define the advantages of using an electronic scoring system in the electronic health record.

Self Assessment Questions:

Which of the following is true regarding outpatient antimicrobial prescribing practices based on recent literature?
A. Less than 10% of antimicrobials prescribed at discharge were fluoroquinolones.
B. Less than 1 in 5 hospitals with antimicrobial stewardship programs monitor use after discharge.
C. Over 30% of patients with asymptomatic bacteriuria were treated with antibiotics.
D. Only 1 in 5 patients who were treated with fluoroquinolones at discharge had met criteria for pneumonia.
Which of the following are functions of the electronic scoring system used by inpatient pharmacists?
A. The electronic scoring system functions by scoring the highest points to patients who have had the highest length of hospital stay.
B. The use of the electronic scoring system can be used only for patients in intensive care units due to their high acuity.
C. Variables can be included in the electronic scoring system to help lengthen time of manual chart review by the pharmacist.
D. Variables can be included in the electronic scoring system to help prioritize pharmacist workload and identify pharmacist interventions in a more efficient manner.
Q1 Answer: B Q2 Answer: D

Implementation of a pharmacist-to-pharmacist transitions of care protocol for patients with chronic obstructive pulmonary disease or diabetes mellitus

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Purpose: Patients are vulnerable when they move between different parts of the healthcare system, and poor transitions of care (TOC) can lead to readmission and increased medical costs. The purpose of this study is to determine the impact of pharmacists-to-pharmacists TOC protocol in both inpatient and ambulatory care settings to increase referral for management of chronic obstructive pulmonary disease (COPD) or diabetes mellitus (DM) to prevent readmission.

Methods: This is a retrospective, single-center, pre-, and post-intervention study using electronic medical record to identify patients admitted to Indiana University (IU) Health Bloomington between October through November 2021 and 2022. Patients were included if they are â‰¥ 18 years old and admitted with primary diagnosis of COPD or DM. Patients are excluded if they are transferred from another institution other than IU Health, non-Indiana residents, or discharged to a facility other than home. The primary endpoint is to determine the impact of pharmacists-to-pharmacists TOC protocol between inpatient and ambulatory care pharmacists on the number of referrals for COPD and DM management. Secondary endpoints include readmission and emergency department visit rate for COPD exacerbation or DM complications within 30 days following discharge. This intervention will consist of an admission medication history evaluation identifying adherence and affordability issue. Before discharge, an inpatient pharmacist will complete an electronic handoff provided to an ambulatory care pharmacist for qualified patients. Data from the pre-intervention period will be collected and compared to data from the post-intervention period. Chi-square and Fisherâ€™s exact test, where appropriate, were used for comparison between groups for categorical data. Comparisons for continuous data utilized the Studentâ€™s t-test for normally distributed data.

Results and Conclusion: Data collection and analysis are currently in progress.

Learning Objectives:

Identify the role of in-patient and ambulatory care pharmacists on the importance of transition of care for the management of patients with COPD or

List the different strategies used to decrease hospital readmission rates and emergency department visits

Self Assessment Questions:

What role can in-patient pharmacists play in transition of care?

A. Assess whether patients can leave the hospital early
B. Question the patient regarding their satisfaction during hospital stay
C. Standardize documentation using electronic handoff to be sent to ambulatory care pharmacists
D. All of the above

Which of the following is a strategy to decrease hospital readmission rates and emergency department visits?

A. Obtain rereferral and schedule follow-up appointments with pharmacist for COPD and DM management
B. Speak with hospitalist concerning the risk of 30-day readmission
C. Pharmacists and nurses should not educate and support patients, families, and caregivers
D. Obtain referral from case manager for outpatient COPD and DM management

Q1 Answer: C Q2 Answer: A

Improving Tolerability of Docetaxel and Reducing the Incidence of Hypersensitivity Reactions Through Infusion Rate Titrations and Pre-medications

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Hypersensitivity reactions(HRS) to chemotherapeutic agents are common and can impede care for cancer patients. These reactions are theorized to be due to IgE-mediated antibodies that target both chemotherapeutic agents and inactive ingredients like polysorbate-80. Docetaxel is a chemotherapeutic Taxene used in the treatment of breast, ovarian, prostate, head and neck, non-small cell lung cancers, or gastric adenocarcinoma. Most patients, >50%, experience HRS to the first or second infusion of docetaxel. Reactions vary by grade and include rash, hand-foot syndrome, flushing, chest tightness, back pain, dyspnea, drug fever, or chills. Severe reactions include hypotension, bronchospasm, generalized rash/erythema, or very rarely, anaphylaxis. Tolerance of docetaxel has improved with the implementation of pre-medication with dexamethasone and antihistamines, infusion titrations, and extended infusion durations. This retrospective analysis aims to explore the effectiveness of evidence-based management and prophylaxis for hypersensitivity reactions related to docetaxel infusions.

Learning Objectives:

Identify potential triggers of hypersensitivity reactions in patients receiving docetaxel

Review the effectiveness of evidence-based management and prophylaxis of hypersensitivity reactions to docetaxel

Self Assessment Questions:

Docetaxel is cytotoxic agent that frequently triggers acute infusion related reactions. Which of the following components of Docetaxel is theorized to cause these reactions?

A. Docetaxel
B. Polysorbate-80
C. Ethanol
D. Two of the above are correct

Which of the following risk factors increase your potential to produce a hypersensitivity reaction to Docetaxel?
A. Hx of atopy (Heightened immune response)
B. Presence of respiratory dysfunction
C. Skin reactions to other Taxene agents
D. A, B and C
Q1 Answer: D Q2 Answer: D

5 mg of IV Vitamin K is Safe and Effective to Reverse Life-Threatening Bleeds Secondary to Warfarin

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Vitamin K is a cofactor in the synthesis of clotting factors, important precursors in the formation of a blood clot. It can be administered to counteract the effects of vitamin K antagonists (e.g., warfarin). The 2020 American College of Cardiology Guidelines recommend 5-10 mg of intravenous (IV) vitamin K for reversal of major bleeding due to warfarin, though the optimal dose of IV vitamin K to rapidly lower the INR to a safe range is unknown. Historically, 10 mg has commonly been used. Excess vitamin k administration may lead to thrombosis and warfarin resistance by delaying the time achieve a patientâ€™s INR goal after re-initiation Therefore, the purpose of this study is to compare the guideline-recommend dosing range of 5 mg vs. 10 mg for safety and efficacy.

Methods:
This single center, retrospective cohort study included patients with life-threatening bleeding secondary to warfarin who received IV vitamin K at Loyola University Medical Center from January 1st, 2014 - July 19, 2022. The primary endpoint is percentage of patients within an INR goal â‰¤1.5 at 24 hours IV vitamin K administration (Â±12 hours). Secondary endpoints include thromboembolic events and 30-day mortality. This study is IRB approved.

Results/Conclusion:
Learning Objectives:
Describe the role of vitamin K in reversal of vitamin K antagonists (VKA)
Discuss the importance in optimizing the vitamin K dose for VKA reversal
Self Assessment Questions:
Which of the following statements about warfarin are true?
A. It is a vitamin K antagonist
B. It activates vitamin K epoxide reductase
C. It inhibits vitamin K epoxide reductase
D. A and C
Which route of vitamin K administration is most predictable?
A. Orally
B. Subcutaneously
C. Intravenously
D. Intramuscularly
Q1 Answer: D Q2 Answer: C

Co-Prescribing of Naloxone in the Outpatient Clinic Setting Following Implementation of a Free Take Home Naloxone Program

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Purpose: Despite years of efforts to combat the opioid epidemic with awareness, education, and harm reduction strategies, overdose deaths involving opioids continue to rise. Naloxone is a safe and effective medication that can be used to quickly reverse opioid overdose. Communities involved in opioid overdose education and naloxone distribution (OEND) have a significant reduction in opioid related overdose deaths but logistical barriers with getting naloxone to those who need it continue to persist. This study aims to analyze how implementing a state sponsored take home naloxone program in the outpatient clinic setting improves patient access to naloxone.
Methods: Patients will be selected for the study through retrospective chart review. Patients presenting at ambulatory clinics with an opioid prescription with dosing >/=50 MME/day. Additionally, subcategories of patients with identified risk factors such as history of substance use disorder, history of previous overdose, and those with co-prescribed high-risk medications will be analyzed for naloxone co-prescription rates. In addition to offering free naloxone directly from outpatient clinics, providers will receive education on naloxone prescribing, and best practice advisories helping to flag patients at risk will be implemented. Rates of naloxone co-prescribing before and after implementation of the program will be analyzed using a pooled population of all clinics of interest. All patient information will be stored in a secured database, and all patient identifiers will be removed prior to exporting of data from said database.
Results: This study is pending approval by Institutional Review Board and will begin data collection upon approval. Results from collected data will be presented at the conference as available.

Learning Objectives:
List current barriers to getting naloxone into the hands of patients at high risk of opioid overdose
Identify patients at risk for opioid overdose who would benefit from a naloxone co-prescription
Self Assessment Questions:
Which of the following list the 3 most commonly cited barriers to co-prescribing naloxone?
A. Cost of naloxone, increased "risky behavior" with naloxone, stigma on both patient and providers
B. Need for further education and training for providers, laws restricting naloxone prescribing, cost of naloxone
C. Cost of naloxone, stigma on both patient and providers, need for further education and training for providers
D. Increased "risky behavior" with naloxone, frequent naloxone drug shortages, stigma on both patients and providers
Which of the following patients would most benefit from a naloxone co-prescription?
A. A 58 year old prescribed 5 tablets of 5mg oxycodone following knee surgery
B. A 17 year old patient undergoing a physician monitored benzodiazepine taper
C. A cancer patient who has been well established on a pain regimen of: fentanyl patch 25mcg/hr, morphine 12hr 15mg twice daily, and morphine IR 5mg q4hrs PRN
D. A patient with a history of alcohol use disorder (currently controlled) being started on tramadol 25mg every 6 hours as needed for chronic back pain
Q1 Answer: C Q2 Answer: C

Rate of intubation for alcohol withdrawal patients with liver disease receiving benzodiazepines compared to monotherapy or adjunctive phenobarbital

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Purpose: According to the American Society of Addiction Medicine guidelines, benzodiazepines are considered the drugs of choice in the treatment of alcohol withdrawal syndrome (AWS) due to their well-documented use and efficacy. In limited available literature, phenobarbital has shown benefit in Clinical Institute Withdrawal Assessment of Alcohol Scale, Revised (CIWA-Ar) score reduction and prevention of intubation in AWS patients in the emergency department and intensive care unit respectively without increased side effects compared to benzodiazepines. Despite the growing evidence, providers continue to utilize benzodiazepines, especially in the liver disease population. The purpose of this study is to assess the rate of intubation in AWS patients with liver disease on benzodiazepines versus phenobarbital alone or as adjunctive therapy.

Methods: Data was collected via retrospective chart review for patients receiving benzodiazepines (lorazepam, midazolam, diazepam, or chlordiazepoxide) and/or phenobarbital for AWS from August 1, 2020 to July 31, 2022. Patients were included if they had any of the specified ICD-10 codes relating to liver disease, were 18 years of age or older, and had two consecutive Alcohol Withdrawal Assessment Tool (AWAT) scores of 5 or higher. Patients were excluded if they were already intubated, pregnant, incarcerated, or had a positive urine drug screen for illicit drugs. The primary outcome is the rate of intubation within seven days of admission between the two treatment groups. Secondary outcomes include the mean benzodiazepines dose in lorazepam equivalence, mean phenobarbital dose for AWS management, and change in AWAT scores from time of inclusion to intubation or last score collection within seven days of admission.

Results and conclusions: Results and conclusion will be presented at the Great Lakes Pharmacy Resident Conference.
Learning Objectives:
Identify the place in therapy of benzodiazepines and phenobarbital in alcohol withdrawal syndrome.
Describe the advantages of phenobarbital over benzodiazepines in alcohol withdrawal syndrome.
Self Assessment Questions:
What medication is the first line of therapy for alcohol withdrawal syndrome per the American Society of Addiction Medicine guidelines?

A. Gabapentin
B. Lorazepam
C. Phenobarbital
D. Clonidine
What is a favorable property of phenobarbital as compared to lorazepam?
A. Longer half-life
B. NMDA receptor inhibition
C. Increased benzodiazepines requirements
D. A and B
Q1 Answer: B Q2 Answer: D

Efficacy and safety of perioperative angiotensin II versus catecholamines as a first-line vasopressor in kidney transplant recipients

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Purpose: To compare angiotensin II to standard of care, catecholamine vasopressors, as a first line continuous infusion vasopressor in the perioperative management of kidney transplant recipients.

Methods: This is a single center, quasi-experimental study. Adults â‰¥ 18 years old who underwent a kidney transplant and received continuous infusion vasopressors for blood pressure support according to institutional algorithm in the intraoperative or within a 24-hour postoperative period of transplantation were included. Our center underwent an institutional protocol change in 2022 changing the first-line vasopressor from catecholamine-based regimens to angiotensin II in the perioperative setting of kidney transplantation. Primary outcome will be allograft function including immediate graft function, slow graft function, delayed graft function, and post-transplant immediate, discharge, 1- and 3-month serum creatinine (SCr) and eGFR. Secondary outcomes will be hemodynamic parameters and cumulative incidence of adverse drug events. Hemodynamic parameters will include duration of vasopressor usage, need for additional vasopressors, and time with systolic blood pressure < 120 mmHg while on vasopressors. Adverse drug events will include arrhythmias, hyperglycemia, peripheral ischemia, and arterial or venous thrombotic events. Interim analysis was conducted to compare variables known to influence early allograft outcomes following kidney transplantation using independent t-test and Ï‡2: male gender (p=1.17), donor age > 50 years old (p=0.1), African-American (p=0.107), BMI > 35 kg/m2 (p=0.811), deceased donor kidney transplantation (p=0.787), cold ischemia time (p=0.062), and donor terminal SCr > 1.8 mg/dL (p=0.318).

Results: Data collection is ongoing. Results will be presented at the conference.

Learning Objectives:

Review adverse effects of catecholamines.
Define angiotensin IIâ€™s mechanism of action.

Self Assessment Questions:

Which of the following is a potential adverse effect to catecholamines?
A. Cardiac arrhythmia
B. Immune-mediated colitis
C. Osmotic demyelination syndrome
D. Reactivation of tuberculosis
2. What is the proposed mechanism of action of angiotensin II (Giapreza) on renal hemodynamics?
A. Directly binds to alpha-adrenergic receptors on vascular smooth muscle cells resulting in peripheral vasoconstriction.
B. Directly binds to V1 receptors on vascular smooth muscle cells resulting in peripheral vasoconstriction.
C. Directly binds to vascular smooth muscle cells and decreases release of aldosterone resulting in efferent arteriole vasodilation.
D. Directly binds to vascular smooth muscle cells and increases release of aldosterone resulting in efferent arteriole vasoconstriction.
Q1 Answer: A Q2 Answer: D

COMPARING OUTCOMES OF VIRTUAL VERSUS IN-PERSON EDUCATION IN PEDIATRIC CYSTIC FIBROSIS PATIENTS STARTED ON ELEXACAFTOR/TEZACAFTOR/IVACAFTOR

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of patients with CF. Prior to the COVID-19 pandemic, CFTR modulator therapy education was exclusively conducted by pharmacists through in-person clinic visits at the Riley Hospital for Children Outpatient CF Clinic. At the height of pandemic, telehealth services became more widely utilized for delivering care to CF patients. The objective of this study was to determine if pharmacy education is as effective for information retention on elexacaftor/tezacaftor/ivacaftor (ETI), when completed virtually versus in-person.

Methods: This retrospective chart review study included patients with CF ages 6-11 years old who started ETI between June 1, 2021 to September 30, 2022. Patients/families were educated either virtually or in person and then were given a quiz to complete at their 3-month follow-up visit to assess their retention. The quiz included 8 questions, and patients/families were given 1 point for each question that was answered correctly. Patients/families were excluded if they did not complete a quiz at their 3-month follow-up visit. In addition, patients were excluded from the data analysis for the quiz scores if the parent/guardian who took the quiz was not present for the initial education. The primary endpoint was median quiz scores at the 3-month follow-up visit.

Results: The median 3-month quiz score among patients who received in-person education was 5 (IQR: 4, 7) compared to 6 (IQR: 4.75, 7.25) for virtual education (p=0.282). The median 3-month quiz score among parents/guardians who received in-person education was 7 (IQR: 6, 8) compared to 8 (IQR: 7, 8) for virtual education (p=0.042).

Conclusion: There was no difference in knowledge retention between virtual pharmacy education on ETI provided to pediatric CF patients ages 6-11 years old compared to traditional in-person education.

Learning Objectives:
Describe the epidemiology, prevalence, and pathophysiology of cystic fibrosis.
Discuss the benefits of incorporating pharmacy telehealth services into the cystic fibrosis care model.
Self Assessment Questions:
The regimen of two elexacaftor 50 mg/tezacaftor 25 mg/ivacaftor 37.5 mg tablets every morning and one ivacaftor 75 mg tablet every evening is appropriate for which of the following patients below?
A. 7-year-old female weighing 26 kg with decompensated cirrhosis (Child-Pugh Class C)
B. 6-year-old female weighing 28 kg with compensated cirrhosis (Child-Pugh Class A)
C. 12-year-old male weighing 32 kg with no baseline liver disease
D. 11-year-old male weighing 31 kg with no baseline liver disease
Which of the following is a potential benefit of incorporating pharmacy telehealth services into the CF care model?
A. Increased number of CF-related hospitalizations
B. Decreased percentage of patients with at least 4 annual visits
C. Improved patient compliance with CF medications
D. Fewer opportunities for contact between patients and providers
Q1 Answer: B Q2 Answer: C

Evaluation of Incidence of Intraoperative Hypotension Following Perioperative Discontinuation Versus Continuation of Angiotensin Converting Enzyme Inhibitors and Angiotensin Receptor Blockers

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Purpose: Angiotensin converting enzyme inhibitors (ACEi) and angiotensin receptor blockers (ARB) are medications that are widely used for treatment of many cardiovascular and renovascular indications. Use of these medications perioperatively may increase the risk of intraoperative hypotension and related complications, including acute kidney injury. However,
studies have demonstrated conflicting outcomes, leading to varied practice recommendations and lack of clear guidance. Internal practice guidance at GLMC has been to hold ACEi/ARBs for patients with a glomerular filtration rate of < 45 mL/min or if the ACEi/ARB is prescribed solely for hypertension. The primary objective of this review is to evaluate the practice of discontinuation versus continuation of ACEi/ARBs on the incidence of intraoperative hypotension.

Methods: This single center, retrospective review took place in patients admitted for an elective inpatient procedure at GLMC from January 1, 2018 to June 30, 2022. Data collected for each patient included patient baseline characteristics, blood pressure measurements during hospitalization and surgery information including type of procedure, preoperative medication administration instructions, length of surgery and hospital stay and if the patient received treatment for hypotension. Treatment of hypotension was defined as initiation or increase in rate of vasopressors, inotropes or intravenous fluids, blood transfusion or intra-aortic balloon pump therapy. The primary outcome was incidence of intraoperative hypotension which was defined as a systolic blood pressure (SBP) < 90 mmHg for two consecutive readings. Secondary outcomes included incidence of postoperative hypotension or hypertension and incidence of preoperative hypertension. Hypertension was defined as a SBP â‰¥ 160 mmHg, a diastolic blood pressure â‰¥ 90 mmHg or â‰¥ 20% of the preoperative value for two consecutive elevated readings.

Results/Conclusion: Data analysis is ongoing. Findings will be presented at the 2023 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Define the potential risk of administering an ACEi/ARB preoperatively.

Identify reasons why there has been a lack of clear guideline recommendations regarding perioperative ACEi/ARB use.

Self Assessment Questions:

1. Which of the following is a reason there has been a lack of clear guideline recommendations regarding perioperative ACEi/ARB use?

A. Studies have demonstrated conflicting outcomes in literature

B. There is documented benefit to continue ACEi/ARB in perioperative period, but expert consensus recommendations support discontinuation of the ACEi/ARB

C. There is not enough evidence in literature to provide a recommendation

D. There is clear evidence to provide a recommendation, but guidelines have not yet been updated

Which of the following is a postoperative complication associated with intraoperative hypotension?

A. Increased risk of infection

B. Urinary retention

C. Hemorrhage

D. Acute kidney injury

Q1 Answer: A Q2 Answer: D

Efficacy of IV Iron in Patients Hospitalized for Heart Failure with Preserved Ejection Fraction

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Intravenous (IV) iron repletion in patients with heart failure with reduced ejection fraction (HFrEF) has been shown to reduce heart failure hospitalizations and cardiovascular death. However, current literature surrounding the use of IV iron in heart failure with preserved ejection fraction (HFpEF) is limited.

Methods:
This is a single center, retrospective review of patients with HFpEF admitted between January 1st, 2017 and August 31st, 2022 who received IV iron infusions, such as iron sucrose or iron dextran. Subjects to be included in this study are heart failure (HF) patients with an ejection fraction ï‚³ 50% who received IV iron while admitted with clinical signs, symptoms, and biomarkers consistent with acute HF. Iron deficiency anemia is defined as a serum ferritin <100 ng/mL or 100-299 ng/mL if transferritin saturation < 20%. Subjects will be excluded if reason for dyspnea is of non-cardiovascular origin, baseline hemoglobin < 8 g/dL or > 15 g/dL, or receipt of erythropoietin stimulating agents, IV iron, or blood transfusion within the previous 3 months. Patients will also be excluded if they had any of the following within the previous 30 days: acute coronary syndrome, transient ischemic attack, stroke, or coronary artery bypass graft or other major surgery leading to significant blood loss. The primary outcome of this study is change in hemoglobin 8-12 weeks after IV iron infusion administration. Additional study outcomes include time to all-cause hospitalization, time to HF readmission, and safety associated with IV iron therapy. The primary outcome will be assessed using repeated measures mixed-modeling.

Results:
In progress.

Conclusion:
The results will be discussed.
Learning Objectives:
Define iron deficiency anemia in heart failure.
Recognize the benefit of IV iron repletion in heart failure.
Self Assessment Questions:
What is the most accepted definition of iron deficiency in heart failure?
A. Ferritin < 100
B. Ferritin 100-300, TSAT <20%
C. Ferritin 100-300, TSAT >20%
D. A & B
IV iron repletion has been shown to reduce heart failure hospitalizations and cardiovascular death.
A. TRUE
B. False
C.
D.
Q1 Answer: D Q2 Answer: A

Optimization of Clinical Data Collection Process to Demonstrate Patient Outcomes in an Integrated Health-System Specialty Pharmacy

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Purpose: Specialty pharmacies provide patient-centric specialty pharmacy care through pharmacist clinical assessments, commonly referred to as â€œpatient management programsâ€ by accreditation agencies. These programs are designed to improve patient outcomes, enhance patientsâ€™ quality of life, and decrease total healthcare costs. The Norton Specialty Pharmacy Clinical Patient Management Program (CPMP) encompasses detailed assessments performed by pharmacists and is documented in the electronic medical record. Specialty pharmacists achieve the goals of the CPMP through consistent patient engagement to promote medication adherence, intervene on suboptimal responses to therapy, and proactively manage adverse effects and prevent complications. Capturing the work of the pharmacist, to include disease-specific outcomes, can be challenging. This project aims to optimize current data collection tools to provide a standardized workflow and efficient documentation that includes disease and patient-specific data related to outcomes.
Methods: This process improvement project uses the PDCA (plan, do, check, and act) methodology. Current specialty pharmacy CPMP assessment documentation, accreditation standards, and disease state guidelines were reviewed. Autoimmune disease state-specific clinical assessment tools for data collection were optimized to narrow gaps identified during the review analysis, then built into the electronic medical record as a test of change. Pharmacy staff education and implementation of the refined clinical assessment tools will validate if objectives of this project are met before expanding implementation to additional specialty disease states.
Results/Conclusions: Results and conclusions will be presented at the 2023 Great Lakes Pharmacy Resident Conference.

Learning Objectives:
Describe the value of clinical patient management programs for patients and specialty pharmacies.
Recognize outcome measures of disease activity for selected autoimmune disorders.
Self Assessment Questions:
Which of the following is a benefit of clinical patient management programs for patients and specialty pharmacies?
A. Detection of non-adherence
B. Optimal adverse effect management
C. Increased patient understanding of therapy
D. All of the above
Which of the following is an example of a measure that can be used to demonstrate autoimmune disease-state activity?
A. Assuring follow-up is scheduled
B. Renal function
C. Clinical disease activity index
D. Pregnancy status
Q1 Answer: D Q2 Answer: C

Insulin Dose Modifications in Patients with Type 2 Diabetes Mellitus after Initiation of a Glucagon-Like Peptide 1 Receptor Agonist
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Purpose: Glucagon-like peptide 1 receptor agonists (GLP-1 RAs) are indicated for the treatment of type 2 diabetes mellitus. These medications are commonly utilized for their potent hemoglobin A1c lowering effects in addition to their weight loss, cardiovascular, and insulin sensitization benefits. However, manufacturer labeling warns that when combined with insulin therapy, risk of hypoglycemia may be increased. There is no current standard of care for empirically adjusting insulin doses in patients when starting a GLP-1 RA, and there is little primary literature available to develop a recommendation. The purpose of this study is to evaluate the effect of GLP-1 RA initiation on total daily insulin doses in patients with type 2 diabetes.
Methods: This is a single-center retrospective chart review of patients with an ICD-10 diagnosis code of type 2 diabetes on basal or basal-bolus insulin initiated on a GLP-1 RA from January 1, 2018 to December 31, 2021. This study includes patients from 31 Bronson Healthcare Group ambulatory practice sites in southwest Michigan. The primary outcome is the percent change in total daily insulin dose (TDD) from baseline to six months after GLP-1 RA initiation. Secondary outcomes include: percent change in TDD at 2 weeks, 4 weeks, and 12 months, percent change in hemoglobin A1c at 6 months, and 12 months, proportion of patients achieving a hemoglobin A1c value less than 7% at 6 months and 12 months, and incidence of hypoglycemia and pancreatitis during the study period. Subgroup analyses comparing efficacy outcomes based on primary care provider, endocrinology provider, or pharmacist-driven management were also assessed.
Results/Conclusions: Data collection and analysis are ongoing. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.
Learning Objectives:
Recognize the impact GLP-1 receptor agonists have on glycemic control and insulin requirements in type 2 diabetes mellitus.
Discuss pros and cons of insulin and GLP-1 RA therapies for type 2 diabetes mellitus treatment.
Self Assessment Questions:
GLP-1 RAs have demonstrated an average hemoglobin A1c reduction of approximately: a.0.1-0.2%
A. 0.1-0.2%
B. 0.5-0.9%
C. 0.8-1.8%
D. 2.4-3%
Which of the following drug classes exhibit hemoglobin A1c lowering and weight loss effects?
A. GLP-1 RAs
B. DPP-4 inhibitors
C. Insulin
D. Sulfonylureas
Q1 Answer: C Q2 Answer: A

A study of staff responsibility allocation in the acute healthcare setting, exemplified by heparin-infusion protocols
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community hospital in Lancaster, OH. The change in protocol was a joint decision by nursing and pharmacy leadership teams as a result of a high amount of medication event reports surrounding the administration and titration of intravenous heparin. The implemented protocol changes reduced pharmacist oversight of heparin-infusion titrations, which was believed to be creating a diversion of responsibility between pharmacists and nurses when verifying titration adjustments. Patient outcomes, protocol success rates, and medication event reports were all used to test the differences in efficacy and safety between the two protocols. Data collection occurred 3 months pre-intervention and 3 months post-intervention from July 25, 2022 â€“ October 24, 2022 & October 25, 2022 â€“ January 25, 2023. The primary outcome of this study is the time from heparin infusion start to discharge. The secondary outcomes of this study are 1) total medication event reports filed by nurses across 3 months of data collected in each arm 2) correct nursing interpretation of aPTTs when making dose-titration adjustments throughout entire infusion (All were done correctly per patient - Yes/No) and 3) total percentage of aPTTs in range. Results and analysis are still actively being conducted on this study. No conclusions are able to be discussed at this time.

Learning Objectives:

Recognize why diversion of job responsibility occurs in the healthcare workplace

Identify what healthcare professions are responsible for ens

Self Assessment Questions:

What is NOT a reason that diversion of task responsibility occurs in the healthcare workplace?

A. Managers ignoring the need for interprofessional collaboration

B. Several healthcare team members contributing to one patient's care

C. Complicated processes and workflows

D. Frequent changes in clinical & operational policies

Which team is responsible for ensuring that interprofessional processes in the healthcare setting are accurate and appropriate for all patients and

A. Nursing Team

B. Pharmacy Team

C. Provider Team

D. All of the Above

Q1 Answer: A Q2 Answer: D

Analysis of Antibiotic Utilization Trends for Prevention of Spontaneous Bacterial Peritonitis in Patients with Cirrhosis of the Liver

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Purpose: Patients with cirrhosis of the liver are at an increased risk of developing spontaneous bacterial peritonitis infections. Prophylactic antibiotics have been shown to decrease the rate of spontaneous bacterial infections and reduce short term mortality. The purpose of this analysis is to evaluate patients who are eligible for spontaneous bacterial peritonitis prophylaxis and if their regimen features guideline recommended antibiotic, dose, route, frequency, and duration of therapy. The goal is to implement process improvements if issues are identified with how prophylaxis is utilized within our health system. Methods: A retrospective chart review will be performed on patients 18 years or older and eligible for spontaneous bacterial peritonitis prophylaxis per the American Association for the Study of Liver Diseases guidelines. Inclusion criteria will be previous episode of spontaneous bacterial peritonitis, a diagnosis of cirrhosis with concurrent upper gastrointestinal bleed, or a diagnosis of cirrhosis with low protein ascites (< 1.5 g/L) plus one of the following: serum creatinine > 1.2mg/dL, blood urea nitrogen > 25 mg/dL, serum sodium < 130 mEq/L or Child-Pugh score > 9 with total bilirubin > 3 mg/dL. Exclusion criteria will be receipt of empiric or definitive treatment for spontaneous bacterial peritonitis. Patients will be evaluated if they are receiving spontaneous bacterial peritonitis prophylaxis to the above criteria. Aspects of spontaneous bacterial peritonitis prophylaxis to be evaluated are choice of antibiotic, dose, route, frequency, and duration of therapy. Primary analysis will be descriptive in nature. If follow-up analysis is required to assess post-intervention effectiveness, then chi square testing will be used for statistical analysis.

Results/Conclusions: Results to be presented at the 2023 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify patients with cirrhosis of the liver who would benefit from spontaneous bacterial peritonitis prophylaxis.

Discuss which antibiotic regimens are guideline recommended for spontaneous bacterial peritonitis prophylaxis.

Self Assessment Questions:

Which of the following antibiotics is a guideline recommended antibiotic for spontaneous bacterial peritonitis prophylaxis?

A. Ceftriaxone

B. Piperacillin-tazobactam

C. Vancomycin

D. Gentamicin

Which of the following is a recommended regimen of ciprofloxacin for spontaneous bacterial peritonitis prophylaxis?

A. Ciprofloxacin 500 mg Q12H

B. Ciprofloxacin 500 mg daily

C. Ciprofloxacin 250 mg Q12H

D. Ciprofloxacin 500 mg weekly

Q1 Answer: A Q2 Answer: B

An Assessment of Dalbavancin in a Veteran Population

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Osteomyelitis treatment typically consists of four to six weeks of intravenous antibiotics, which can present challenges for treating patients with complicated social situations. Dalbavancin is a second-generation lipoglycopeptide antibiotic that was approved by the FDA in 2014 to treat skin and soft tissue infections (SSTIs) in patients with or at high risk for methicillin-resistant staphylococcus aureus (s. aureus) infection. Additionally, dalbavancin is used off-label for the treatment of osteomyelitis. Dalbavancin has a long elimination half-life of 346 hours, therefore, it is a promising agent to treat polymicrobial infections that consist of gram-positive organisms with a unique weekly dosing strategy.

This study is a single-center retrospective analysis of patients who received dalbavancin or standards of care for treatment of osteomyelitis at Veteran Health Indiana from October 1, 2019 â€“ March 31, 2022. Patients will be included if they have a diagnosis of osteomyelitis, are greater than or equal to 18 years of age and prescribed daptomycin, vancomycin, cefazolin or dalbavancin for the treatment of osteomyelitis. The primary objective of the study is to determine whether the use of dalbavancin led to favorable clinical outcomes, measured by clinical cure rate, in a veteran population when compared to Veterans that received traditional outpatient parenteral antibiotic therapy (OPAT). The secondary outcome is to ensure that this off-label use of dalbavancin is cost comparable to traditional OPAT. Data will be collected from the electronic health record within the VA. Antibiotics as well as a corresponding OPAT note from a pharmacist will be used to identify eligible patients for analysis. Data collected will be de-identified through utilization of random study number assignments. Patients will not be contacted.

Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify patients that would benefit from dalbavancin OPAT therapy over traditional OPAT therapy options for osteomyelitis
Describe potential advantages of dalbavancin therapy rather than traditional OPAT therapy options for osteomyelitis

Self Assessment Questions:

Which patient would benefit from dalbavancin therapy rather than traditional therapy (vancomycin, cefazolin, daptomycin) for treatment of
A. 63 year old patient, second osteomyelitis diagnosis with history of IV drug use.
B. 72 year old patient, first osteomyelitis diagnosis with cefazolin susceptible organism
C. 68 year old patient, with osteomyelitis diagnosis and gram-negative rod bacteria found on bone culture
D. None of the above

What is an advantage of dalbavancin therapy for patients with osteomyelitis ?
A. Shorter treatment duration
B. Patient does not require a PICC (peripherally inserted central catheter) for discharge
C. Both A and B
D. None of the above

Q1 Answer: A Q2 Answer: C

Assessing the Need for a Pharmacist-Led Warfarin Dosing Service in a Community-Based Academic Medical Center

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Purpose: For patients requiring warfarin therapy, the international normalized ratio (INR) must remain within the therapeutic range in order to maximize efficacy and minimize toxicity. The narrow therapeutic range of warfarin, along with extensive food and drug interactions, present a challenge to practitioners to maintain a time in therapeutic range (TTR) for the INR. Current literature suggests an improvement in TTR for pharmacist-managed warfarin therapy. The goal of this study is to assess the need for this pharmacy service at our facility. This will be evaluated through the assessment of current warfarin management strategies implemented by non-pharmacy providers.

Methods: The institutional review board has approved this single center, retrospective analysis conducted in a community-based academic medical center. This study will include patients on warfarin therapy initiated either prior to or during hospitalization. The primary outcome of this study is to evaluate TTR of INR in patients treated with warfarin initiated and managed by non-pharmacy providers. Secondary outcomes include safety endpoints, such as major bleeding and clotting events, as identified by ICD10 codes. Additionally, a focus of this study is to assess the proportion of patients who received medication counseling for warfarin therapy by a pharmacist prior to discharge.

Results/Conclusions: Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss common barriers to warfarin therapy presented in the inpatient setting
Identify opportunities for pharmacists to optimize warfarin prescribing and monitoring practices in a community-based academic medical center

Self Assessment Questions:

What opportunities are present for pharmacists to ensure the appropriateness of warfarin therapy?

A. Verify indication, INR goal, and duration of therapy
B. Evaluate drug interactions and make dosing recommendations
C. Create a hospital dosing protocol to allow for prompt interventions by pharmacists
D. All of the above

What are common barriers clinicians face while caring for patients on warfarin therapy?

A. Inability for patient to communicate home warfarin dose
B. Drug interactions
C. Fluctuations in INR secondary to acute illness
D. All of the above

Q1 Answer: D Q2 Answer: D

Evaluating Renal Outcomes Associated with Intraoperative Redosing of antibiotics

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Multidisciplinary guidelines recommend redosing prophylactic antibiotics to ensure adequate serum and tissue concentrations if the duration of the procedure exceeds two drug half-lives or there is excessive intraoperative blood loss. For prophylactic antibiotics such as piperacillin-tazobactam, ampicillin-sulbactam, and cefoxitin, intraoperative re-dosing may occur as frequently as every 2 hours due to their pharmacokinetics. However, little is known about the safety of this frequency of dosing in extended duration surgical procedures. The purpose of this study is to investigate the impact of SAP redosing in surgeries greater than 6 hours long on rates of post-operative acute kidney injury (AKI) as well as other antimicrobial related adverse events.

Methods: This study was a single center, retrospective, quasi-experimental chart review evaluating surgical patients at the University of Kentucky HealthCare from January 01, 2016, through August 30, 2022. Adult patients who underwent surgical procedures lasting 6 or more hours and received intraoperative antimicrobial prophylaxis with piperacillin-tazobactam, ampicillin-sulbactam, or cefoxitin are included. The primary endpoint was the incidence of AKI as defined by KDIGO in patients who received the recommended frequency of intraoperative antibiotic redosing, compared to a matched cohort who received less frequent antibiotics. Confounding factors such as intraoperative vasopressor use, blood loss, and concomitantly administered nephrotoxic agents were evaluated for impact on AKI risk. Secondary outcomes included SSI, need for renal replacement therapy, or new C. difficile infection within 30 days of procedure. Patients were propensity matched based on surgery type, age, sex, and pertinent confounding factors.

Learning Objectives:

Discuss the risks and benefits of intraoperative antimicrobial prophylaxis redosing in extended surgical procedures.Â
Identify populations at higher risk of post-operative AKI after extended surgical procedures.

Self Assessment Questions:

The 2013 IDSA/ASHP/ SHEA guidelines provide clear guidance for appropriate antibiotic use in all the following scenarios except:

A. Dosing interval adjustments for clindamycin a patient that suddenly loses 1575 mL of blood during a cardiac surgery case
B. Initial dose selection for cefazolin in a patient found to weigh 154 kg
C. Dosing interval adjustments for ampicillin-sulbactam in a patient found to have a CrCl of 41 mL/min
D. Dosing interval guidance for a newly approved antibiotic with a half-life of 3 hours.

Which of the following is least likely to be a contributing factor to post-operative AKI?

A. High intraoperative blood loss
B. Use of pressors intraoperatively
C. Pre-operative use of ACE inhibitors or ARBs
D. Pre-operative beta blocker use

Q1 Answer: C Q2 Answer: D

Prescribing Compliance with Guideline Directed Medical Therapy for American College of Cardiology/American Heart Association Heart Failure Guidelines

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Purpose:
There are two types of heart failure, systolic heart failure and diastolic heart failure. Systolic heart failure presents with reduced ejection fraction and the heart muscle doesnâ€™t contract enough to provide blood flow forward. Diastolic heart failure is heart failure with preserved ejection fraction and the heart muscle contracts normally, but the ventricles do not relax normally. Current guideline directed medical therapy focuses on systolic heart failure with an ejection fraction of 40% or less, heart failure with reduced ejection fraction (HFrEF). Heart failure with reduced ejection fraction is diagnosed based on patient symptom presentation using the American College of Cardiology/American Heart Association heart failure stages and the New York Heart Association classifications. After diagnosis is confirmed, ejection fraction is measured to determine the type of heart failure present. For HFrEF, a guideline directed medical regimen will consist of an angiotensin receptor-neprilysin inhibitor /angiotensin converting enzyme inhibitor/angiotensin II receptor blocker, a sodium glucose cotransporter-2 inhibitor, a preferred beta-blocker (carvedilol, bisoprolol, or metoprolol extended release), a mineralocorticoid receptor antagonist, and a loop diuretic as needed for fluid retention.

Methods:
Patients enrolled at the heart failure clinic identified as having reduced ejection fraction will be reviewed using their medical chart on allscripts.catholichealth.net. Chart review will consist of confirming current guideline directed medication therapy regimen for patients specifically seen at the heart failure clinic and reviewing guideline directed medication therapy for the entirety of the clinic with a diagnosis of heart failure with reduced ejection fraction. During the review process, the HF clinic will be compared with the entirety of the clinic to look at differences in therapy. The secondary outcome will be measured through noting indications of hospitalizations/ER visits documented in the medical chart.
Learning Objectives:
Define Guideline directed medical therapy (GDMT) for heart failure with reduced ejection fraction
Discuss The importance of current guideline directed medical therapy (GDMT) for heart failure with reduced ejection fraction based on patient outcomes from clinical trials
Self Assessment Questions:
Which medication classes are considered guideline directed therapies for heart failure with reduced ejection fraction according to the American College of Cardiology and American Heart Association?
A. Angiotensin receptor-neprilysin inhibitor /angiotensin converting enzyme inhibitor/angiotensin II receptor blocker
B. Sodium glucose cotransporter-2 inhibitor
C. Calcium channel blocker
D. A and B
Which of the following guideline directed medical therapies for heart failure with reduced ejection fraction have marked reduction in mortality?
A. Spironolactone
B. Metoprolol Succinate, Carvedilol, Bisoprolol
C. Furosemide
D. A and B
Q1 Answer: D Q2 Answer: D

Review of Gender Affirming Hormone Therapy Utilization at an Academic Medical Center
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Purpose: Gender-affirming hormone therapy (GAHT) is composed of hormonal and non-hormonal medications with the goal of reducing endogenous sex hormones driving secondary sex characteristics and replacing with exogenous hormones consistent with the individualâ€™s gender identification. Estradiol and testosterone are feminizing and masculinizing hormones, respectively, and are the mainstay of hormonal therapy for transgender individuals. Additionally, progesterone can be used as a feminizing supplemental therapy. These medications vary in appropriate dosing and come in multiple formulations. Formulary restrictions may lead to potential missed or delayed doses if supply is not available. Additionally, there are few resources to aid in accurately converting between GAHT formulations which could lead to dosing errors. This retrospective review looked to assess hormonal GAHT at an academic medical center to identify areas for improvements in drug formulary, healthcare team education, and workflow surrounding the dispensing and administration of hormone affirming therapies. The need for this evaluation stemmed from the lack of direction currently provided to a healthcare team for an individual requiring gender affirming care.

Methods: Dispensing data over the span of a year for testosterone cypionate and enanthate, estradiol cypionate and valerate, and oral progesterone was assessed for appropriate formulary interchange, medication errors and delays of care. Inclusion criteria included patients with an inpatient or â€œpatient own supplyâ€ order for the listed GAHT prescribed for gender affirming care. Data collection included demographics, admitting hospital service, length of stay, GAHT prior to admission, GAHT administered during admission including dose, route, number of administrations or omitted doses, documented medication reconciliation, presence of an endocrine consult, and any hormone levels collected.

Results & Conclusions: This study underscored the need for further resources for healthcare team members surrounding GAHT and opportunities for a more inclusive formulary. Further findings to be presented at the Great Lakes Pharmacy Residency Conference.
Learning Objectives:

Recognize areas of opportunity within a health-system for a more inclusive formulary to avoid gaps in patient care or medication errors
Identify current resources available for GAHT and understand their use and potential limitations

Self Assessment Questions:

Which of the following resources and/or guidelines can be used for gender affirming hormone therapy?
A. WPATH SOC 8th Version
B. Transline HRT
C. UCSF Transgender Care
D. All of the above

Which of the following characteristics may lead to an increase in errors when estradiol is used in the inpatient setting?
A. Limited formulary options
B. Lack of clear guidance for formulation substitutions
C. Large dosing range
D. All of the above

Q1 Answer: D Q2 Answer: D

Evaluation of the impact of an emergency medicine pharmacist on antimicrobial-related sepsis metrics within a community emergency department

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Purpose:

Antibiotics are a crucial component in the treatment of patients with severe sepsis and septic shock. Timeliness as well as appropriate antibiotic selection can influence patient outcomes, including mortality. Emergency medicine (EM) pharmacists are in an integral position to promote rapid treatment of critically ill patients. This study investigated time to antibiotic administration in patients with severe sepsis or septic shock when an EM pharmacist procured the antibiotics compared to other healthcare team members.

Methods:

A retrospective chart review was conducted on patients with severe sepsis and septic shock who received intravenous antibiotics in the emergency department (ED) at UofL Health-Mary & Elizabeth Hospital between September 2020 to July 2021 and September 2021 to July 2022. Patients who received antibiotics the year before implementation of a dedicated EM clinical pharmacist in the ED were compared to a cohort of patients who received antibiotics procured and prepared by an EM pharmacist. Patients with severe sepsis or septic shock presenting to and admitted through the ED were eligible for inclusion in this study. CMS core measure definitions were used to determine time zero for time to antibiotic administration. Vulnerable patient populations as well as trauma patients, COVID-19 positive patients, and patients without a documented source of infection were excluded. The primary objective was time to antibiotic administration. Secondary objectives included appropriateness of antibiotics, length of stay in the hospital and intensive care unit, in-hospital mortality, time of second dose of antibiotics, and blood culture timing. Patients were identified using ICD-10 codes for severe sepsis and septic shock and further grouped into those patients who had antibiotics procured and prepared by either an EM pharmacist or another member of the healthcare team using automated dispensing cabinet reports.

Results/Conclusion:

Results and conclusions will be presented at the 2023 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify the importance of early administration of antibiotic therapy in patients presenting with severe sepsis or septic shock
Describe the role of an emergency medicine pharmacist in the management of patients with severe sepsis and septic shock

Self Assessment Questions:

Which of the following is associated with early administration of appropriate antimicrobial therapy in patients presenting with septic shock?
A. Decreased in-hospital mortality
B. Increased in-hospital mortality
C. Risk of antimicrobial resistance
D. Prolonged intensive care unit length of stay

An emergency medicine pharmacist can influence care of a septic patient by:
A. Providing input on antimicrobial selection
B. Review of previous microbiology culture results
C. Promoting antimicrobial stewardship
D. All of the above

Q1 Answer: A Q2 Answer: D

Evaluation of one-bag vs two-bag system for treatment of Diabetic Ketoacidosis

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Traditionally, a one-bag system for diabetic ketoacidosis (DKA) treatment has been utilized in the adult patient population. The one-bag system can be defined as a non-dextrose containing crystalloid fluid running at a fixed rate in combination with an insulin infusion. Once serum glucose meets a certain threshold, dextrose containing fluids are started. However, in the adult patient population, there is growing literature that demonstrates a two-bag system (non-dextrose containing and dextrose containing crystalloid) is associated with earlier correction of acidosis, shorter duration of IV insulin infusion, fewer IV bags used, and reduction in hypoglycemia occurrence. This was a single center, retrospective cohort study at a 1500 bed quaternary care, academic medical center comparing patients with DKA who were treated with the one-bag versus two-bag system. Adults, aged 18 to 89 years old, presenting with the diagnosis of DKA between January 2021-June 2021 (one-bag) and January 2022-June 2022 (two-bag) were included. Patients were excluded if they had hyperglycemic hyperosmolar state, transferred from an outside hospital, pregnant, or prisoners. The primary outcome was time to DKA resolution after presentation when using the two-bag method versus a one-bag method. The secondary outcomes were the incidence of hypoglycemia (serum or point of care glucose <70 mg/dL) and severe hypoglycemia (defined as a serum or point of care glucose <40 mg/dL), hypokalemia (K <3.3 mEq/L), and incidence of a continuous dextrose containing fluid being initiated once a serum or point of care glucose met a defined threshold in the two-bag system versus the one-bag system. The results from this retrospective study will inform future clinical guidelines at our institution as well as be one of the first studies examining the impact of the two-bag system in the adult population. Preliminary results will be shared at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss the pathophysiology of diabetic ketoacidosis and the methods behind treatment.
Review data supporting the one-bag and two-bag systems for the treatment of diabetic ketoacidosis in adults.

Self Assessment Questions:

What is a life-threatening risk of insulin therapy for diabetic ketoacidosis in adults?
A. Hyperglycemia
B. Hyperkalemia
C. Acidosis
D. Hypoglycemia

A patient is being treated with the two-bag system for DKA and his labs return as BG=210 mg/dL, AG=19. What fluid(s) should be running?
A. Bag 1 (no dextrose) and Bag 2 (with dextrose)
B. Bag 1 (no dextrose) ONLY
C. Bag 2 (with dextrose) ONLY
D. Stop fluids and transition to subcutaneous insulin

Q1 Answer: D Q2 Answer: B

Piloting Inpatient Pharmacist Staffing Enhancements to Improve Employee Engagement and Maintain High Quality Patient Care

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Given the current state of healthcare following the COVID-19 pandemic, maintaining an engaged workforce is a key priority in healthcare. Many pharmacy leaders are considering engagement a high priority due to the difficulties hiring and retaining staff. The Froedtert Hospital Department of Pharmacy has identified a need to enhance the current pharmacist staffing model based off results from the 2021 employee engagement survey. This project aims to identify enhancements within the acute care pharmacist staffing model that will maintain high quality patient care and positively increase employee engagement.

The primary objective of this pre-post quality improvement project is to evaluate the impact of the staffing model enhancements on pharmacist engagement. This will be measured by changes in the validated Areas of Worklife Survey (AWS) scores. Paired surveys will be conducted anonymously with a unique code that is self-assigned at the beginning of the survey based on a series of objective, non-identifiable questions. All pharmacists staffing on pilot units will be included in the survey. Secondary objectives include maintaining the same level of pharmacy services and ensuring patient safety. These secondary outcomes will be measured through randomized quality assurance monitoring, patient safety event reporting, and external stakeholder (ex. nursing, providers) feedback.

This project will be conducted in three phases: discovery, piloting, and feedback. A workgroup of frontline pharmacists will be formed to generate potential staffing model changes that could improve engagement. Using an impact/effort matrix, the interventions with the highest impact and lowest effort will be considered as potential pilot enhancements. These enhancements will be piloted on seven acute care units over a four month period. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify staffing model enhancements that support staff satisfaction
Describe how modifying pharmacist workflows influences employee engagement survey results

Self Assessment Questions:

Staffing model enhancements that were considered in this project include

A. Work from home

B. Reduced number of evening shifts

C. Centralized workflow modifications

D. All of the above

Measures used to evaluate maintenance of quality patient care include all but the following

A. Safety events

B. Key stakeholder feedback (ex. nursing, providers)

C. Patient feedback

D. Randomized quality assurance monitoring

Q1 Answer: D Q2 Answer: C

Impact of Pharmacy Driven Ordering of Stress Ulcer Prophylaxis and Oral Antiseptic Therapy in Mechanically Ventilated Patients

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and ventilator-associated pneumonia (VAP). Proton pump inhibitors (PPI) or histamine-2 receptor antagonists (H2RA) are recommended for GI bleeding prophylaxis in patients intubated for > 48 hours and oral antiseptic therapy is recommended to reduce the risk of VAP. Henry Ford Health implemented the â€œPharmacist Medication Initiation Policy for Stress Ulcer Prophylaxis (SUP) and/or Oral Antiseptic Therapy in Adult ICU Patientsâ€policy on 8/24/2021. This protocol outlines how a pharmacist may order SUP and/or oral antiseptic therapy to reduce the risk of GI bleeding and VAP. This study aims to characterize adherence to the SUP and/or oral antiseptic therapy policy and determine the impact of pharmacist driven ordering of these agents.

Methods: This study is a retrospective, before-after, cohort study on patients admitted to a Henry Ford Health ICU from 8/1/2020-7/24/2021 (before policy) and 9/24/2021-8/31/2022 (after policy). Patients that were â‰¥ 18 years old and mechanically ventilated for â‰¥ 48 hours were included. Patients were excluded if they were pregnant, had active treatment for GI bleed, stress ulcer, or pneumonia prior to intubation, had an allergy to chlorhexidine products, PPI, or H2RA, or were receiving active PPI or H2RA therapy for alternative indication. The primary endpoint is the incidence of stress ulcers/GI bleeds and VAP occurrences from before and after policy initiation. The secondary endpoints include the average time to ordering SUP and/or oral antiseptic therapy after intubation, the incidence of appropriate SUP and/or oral antiseptic therapy initiation, overall mortality, average ICU length of stay, and the incidence of Clostridioides difficile associated diarrhea infections from before and after the policy initiation.

Results and Conclusion: Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Recognize the risks of mechanical ventilation.

Discuss the importance of initiating prophylactic therapy in mechanically ventilated patients.

Self Assessment Questions:

Which of the following is a risk of mechanical ventilation?

A. VAP

B. Hypertension

C. GI Bleed

D. Both A and C

Which of the following statements is correct in intubated patients?

A. Chlorhexidine mouthwash may reduce the rate of VAP

B. All patients will experience stress ulcers if not receiving a PPI or H2RA

C. Only PPI therapy has been found to reduce the rate of GI bleeding

D. Oral antiseptic therapy decreases mortality

Q1 Answer: D Q2 Answer: A

Utilization of Risk Stratification in Patients with Diabetes Mellitus in a Health System Specialty Pharmacy Setting

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Purpose: Integrated pharmacist care into health systems results in significant A1C reduction and improved outcomes in patients with diabetes mellitus. However, little is known about the adoption of chronic disease management (CDM) services into a health system specialty pharmacy (HSSP) workflow. Risk stratification is critical to enhancing care with this high-volume patient population. The purpose of this study is to describe how the implementation of risk stratification in the HSSP setting results in optimized patient outcomes in diabetes.

Methods: This is a retrospective descriptive study reporting the results of expanding the HSSP care model to implement risk-stratified CDM services for patients with diabetes. Patients were enrolled into the services and risk stratified based on A1C value. Patients with an A1C greater than or equal to 10 were placed into a high-risk group and received high-touch clinical education and support from pharmacists. Patients in the high-risk group were moved into the low-risk group once their A1C was less than 8. Results were compared to A1C values of a patient cohort not using health system CDM pharmacy services.

Results: A total of 460 patients were enrolled in CDM pharmacy services. Eighty-eight patients received high touch clinical support from pharmacists. The average baseline A1C of this group was 11.47 and the most recent average A1C of 8.84 (2.63-point reduction). Sixty-three of these patients graduated from the high-risk group, in an average of 192 days. The remaining 372 patients were stratified into the low-risk group. Their average baseline A1C was 8.41 and the most recent average A1C was 7.54 (0.87-point reduction).

Conclusion: This study demonstrates the impact HSSPs can have on CDM and outlines a strategy to provide the greatest impact in a high-volume patient population.

Learning Objectives:

Discuss implementation of health system specialty pharmacy in a chronic disease management program.

Recognize utilization of risk-stratification in reduction of A1c values.

Self Assessment Questions:

Which of the following benefits were seen when implementing a health system specialty pharmacy in a chronic disease management program?

A. Increase in A1c

B. Decrease in A1c

C. Lower adherence rates

D. Decreased pharmacist interventions

Which of the following are potential reasons a patient might be considered high risk?

A. A1c value less than 7

B. Good medication adherence

C. High health literacy

D. A1c greater than 10

Q1 Answer: B Q2 Answer: D

Rotational Thromboelastometry Predictors of Thrombosis in Patients with a Left Ventricular Assist Device

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Purpose
Left ventricular assist devices (LVADs) are surgically implanted, battery-operated mechanical pumps that help the left ventricle pump blood to the rest of the body. Although LVADs may prolong patient survival, they are associated with many life-threatening complications, such as pump thrombosis, ischemic stroke, and arterial thrombi. Utilizing viscoelastic testing with rotational thromboelastometry (ROTEM), may allow us to screen for coagulopathy in patients with an LVAD. The purpose of this study was to identify ROTEM characteristics associated with thrombosis in hospitalized patients with an LVAD. Identified characteristics may be utilized in the future to proactively adjust antithrombotic regimens to decrease the rate of thrombotic events in patients with an LVAD.

Methods
This was a single-center, retrospective cohort study of patients with an LVAD who were hospitalized between January 1, 2013 to December 1, 2022 (n=238). ROTEMs were collected during the first 24 hours of hospitalization in patients with new thrombosis (n=39) and compared to those without thrombosis (n=199). Thrombosis was defined as either ischemic stroke, pump thrombosis, arterial thrombi, deep venous thrombosis, or pulmonary embolism. Up to five ROTEMs were collected per patient, including INTEM, EXTEM, and FIBTEM. ROTEMs were excluded if they were from the patientâ€™s implant hospitalization or bleeding admission, received a parenteral antithrombotic agent, parenteral antiplatelet agent, reversal agent, or blood product within 48 hours of ROTEM collection. The primary outcome assessed the difference in EXTEM maximum clot firmness between patients with thrombosis compared to patients without thrombosis. A univariable binary logistic regression model was used to estimate the unadjusted effects of EXTEM maximum clot firmness by thrombosis. Wald 95% confidence intervals were reported for each odds ratio estimate, and Type III Wald Chi-square p-values were reported for each variable.

Results & Conclusion to be presented at Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Recognize consequences of thrombosis in patients with a left ventricular assist device

Describe the role of rotational thromboelastometry for predicting thrombosis in patients with a left ventricular assist device

Self Assessment Questions:

What is a potential consequence of thrombosis forming in patients with an LVAD?

A. Ischemic stroke
B. Pump failure
C. Arterial thrombi
D. All of the above

Which of the following rotational thromboelastometry measurement may be most indicative of thrombosis in patients with a left ventricular assist

A. FIBTEM maximum clot firmness
B. EXTEM maximum clot firmness
C. FIBTEM clot formation time
D. EXTEM clot formation time

Q1 Answer: D Q2 Answer: A

Professional Continuous Glucose Monitoring (CGM) Service Implementation at Trinity Health Muskegon Primary Care Offices

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Purpose:
Continuous glucose monitoring (CGM) devices allow users to view their interstitial glucose levels on an intermittent or continuous basis. Several randomized controlled trials have demonstrated the benefits of CGM utilization in reducing A1c and hypoglycemic event frequency. The 2023 American Diabetes Association (ADA) Standards of Medical Care reflect these benefits, recommending personal CGM utilization especially for patients on basal and multiple daily insulin injections. Despite these benefits, insurance coverage and cost remain a significant barrier to personal CGM access. A more accessible option is professional CGM where the device is clinic-owned, allowing patients to wear a sensor for a short period before returning to the clinic to review glucose trends with a provider. Implementation of professional CGM services can improve glycemic education, allow patients to trial CGM prior to considering personal use, and improve medication management. The purpose of this quality initiative is to describe the implementation of professional CGM services in primary care clinics.

Methods:
Eligible patients had history of type 2 diabetes and A1c > 9%, with a recent primary care visit within the Trinity Health Medical Group. Patients were excluded if they had a history of type 1 diabetes, were currently managed by endocrinology, or were taking chronic hydroxyurea. CGM readers and sensors were acquired for each clinic. The ambulatory pharmacy team developed standard workflow processes for this service. Patients were contacted for enrollment and service was implemented starting in January 2023. The primary endpoints include percent of time active, average blood sugar, time in range, time below range (low or very low), time above range (high or very high), number of hypoglycemic events, glycemic variability, and medication changes after CGM session.

Results/Conclusions: In process. To be presented at GLPRC.
Learning Objectives:
Identify diabetes-related patient factors which could benefit most from CGM utilization
List the responsibilities of the ambulatory care pharmacist for the professional CGM service
Self Assessment Questions:
Which of the following diabetes-related patient factors would most likely benefit from professional CGM services?
A. A1c 7.4%
B. Single fingerstick glucose check daily
C. Newly diagnosed type 2 diabetic on metformin
D. Frequent hypoglycemic unawareness
Which of the following are part of the ambulatory care pharmacist responsibilities when implementing a professional CGM service?
A. Identification and recruitment of eligible patients
B. Sensor placement and device education
C. Initiation or titration of diabetic medications
D. All of the above
Q1 Answer: D Q2 Answer: D

Implementation of a Pharmacist-led Transitions of Care Service to Prevent Readmission of Patients with COPD Exacerbations
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healthcare system, leading to an estimated $50 billion spent annually. Of that amount, $29.5 billion is attributed to direct healthcare spending with 726,000 hospitalizations and 1.5 million ER visits occurring per year in the United States. This high utilization of the healthcare system leads to an average total cost of $9,800 per COPD patient annually. A 30-day readmittance following a COPD exacerbation is associated with increased mortality and the rate is estimated around 20% for Medicare patients in the United States. Previous studies demonstrate that Pharmacist intervention helps prevent readmissions by providing discharge counseling, medications reconciliation and follow-up calls or appointments. The intention of my research is to establish the impact that a pharmacist-led service can have on 30-day readmissions for patients with a COPD exacerbation.
METHODS: Participant were recruited for this study using a discharge report of patient discharging from a Saint Joseph Health System hospital with a principal diagnosis of a COPD exacerbation. Baseline characteristics were collected for qualified patients and were contacted by a pharmacist within 14 days of discharge. Pharmacist intervention was completed via telephone call and consisted of a comprehensive medication reconciliation, education on the disease state, assessment of adherence to pharmacotherapy, assessment of inhaler technique, smoking cessation counseling and identification in gaps in care. The primary endpoint of the study is readmittance with 30 days with a secondary endpoint of number and type of interventions performed. The primary endpoint will be evaluate using a paired t-test and compared to previous yearâ€™s readmission rate of 14.3% (41/286).
RESULTS: Data collection and analysis are currently in progress. Results and conclusions will be presented at Great Lakes Pharmacy Residency Conference.
Learning Objectives:
Describe the barriers that lead to non-adherence of inhaler regimens
Select appropriate pharmacotherapy for a patient with COPD based on the 2023 GOLD Guidelines
Self Assessment Questions:

Which of the following inhalers will providing a spacer benefit a patient who cannot demonstrate proper inhaler technique?
A. Breztri Aerosphere
B. Trelegy Ellipta
C. Stiolto Respimat
D. Turdoza Pressair
Which of the following factors strongly favors the use of an inhaled corticosteroid for a patient with COPD per the 2023 GOLD Guidelines?
A. History of smoking
B. Blood eosinophil count â‰¤100cell/ÂµL
C. History of pneumococcal infections
D. History of hospitalization for COPD exacerbation
Q1 Answer: A Q2 Answer: D

Cefepime vs meropenem for infections due to HECCcK-YeS MAm organisms with cefepime MICs of 4-8 mCg/mL (S-DD)

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hyperproduction (AmpC organisms) with a cefepime minimum inhibitory concentration (MIC) of 4-8 mCg/mL (susceptible dose-dependent or S-DD). Cefepime was suggested only for organisms with a cefepime MIC of â‰¤ 2 mCg/mL. This runs contrary to pharmacokinetic/pharmacodynamic data and Clinical and Laboratory Standards Institute (CLSI) M100 guidance, which only considers an organism resistant with an MIC of â‰¥ 16 mCg/mL. The purpose of this study is to evaluate the clinical efficacy of cefepime in comparison to meropenem for the treatment of infections caused by AmpC organisms with a S-DD cefepime MIC. This was a retrospective noninferiority study evaluating patients treated within Indiana University Health (IUH) System from 2015 through 2022. Patients were included if they had infections due to AmpC organisms with a cefepime S-DD MIC treated with cefepime or meropenem for most of their treatment course. Exclusion criteria were multiple days of concomitant therapy with another agent with activity against the AmpC organism, inadequate antibiotic dosing per institutional dosing policy, extended spectrum Î²-lactamase (ESBL) or co-production, and carbapenem resistance. The primary endpoint of this study will be rate of clinical failure, defined as a composite of in-hospital mortality and antibiotic escalation due to clinical worsening. Secondary endpoints will include positive repeat blood cultures within 7 days of treatment initiation, and ESBL or carbapenem resistant organism isolation during or following treatment. Data will be analyzed via Chi-Square test. A one-sided Î± of 0.025 and Î² of 0.2 will be used. An estimated sample size of 1452 patients, 726 in each group, will be needed to appropriately power the study to 80% to determine noninferiority of outcomes with non-inferiority margin of 10%. Data collection is ongoing. Will be presented at the 2022 Great Lakes Pharmacy Residency Conference.

Learning Objectives:
List organisms at risk of chromosomally mediated AmpC hyperproduction and describe the clinical significance of AmpC organisms.
Describe the clinical significance of the use of cefepime versus meropenem in organisms with cefepime susceptible dose-dependent (S-DD) MICs.

Self Assessment Questions:
Which of the following organisms is at high risk of inducible AmpC production?
A. Escherichia coli
B. Klebsiella aerogenes
C. Serratia marcescens (cefoxitin susceptible)
D. Proteus mirabilis
A patient is growing Enterobacter cloacae out of blood cultures with the following susceptibilities: Cefoxitin >=64 R; Ceftriaxone >=64 R; Piperacillin/tazobactam >=128 R; Cefepime 8 S-DD; Meropenem <=0.25 S; Sulfamethoxazole/trimethoprim <=20 S; Ciprofloxacin 2 I. Assuming the patient has a history of sulfa allergy, which of the following is an appropriate treatment based on the IDSA Antimicrobial Resistance Guidance?
A. Cefepime 1g every 8 hours (extended infusion)
B. Cefepime 2g every 8 hours (extended infusion)
C. Sulfamethoxazole/trimethoprim 800/160mg DS tablet two tablets twice daily
D. Meropenem 1g every 8 hours (extended infusion)
Q1 Answer: B Q2 Answer: D

Assessment of Cost Reduction between ACO Patients Managed at Outpatient Anticoagulation Clinic as Compared Managed Externally

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Purpose:
Accountable care organizations (ACOs), which are available through Centers for Medicare & Medicaid Services (CMS) and private insurance companies, are comprised of a group of healthcare providers and hospitals, whose primary goal is to improve the quality of patient care and decrease health care costs. If the ACO achieves target savings, the money saved can be distributed to all members of the ACO. The purpose of this project is to review the financial and clinical outcomes of Community Healthcare Systemâ€™s ACO patients when their warfarin is managed in the outpatient pharmacist anticoagulation (AC) clinic, as compared to those not managed by pharmacists.
Methods:
This study is a retrospective analysis of the financial and clinical outcomes of ACO patients when their anticoagulation is managed in the outpatient anticoagulation (AC) clinic, as compared to external management. ACO patients of the hospital system from January 1, 2020 to December 21, 2021 were evaluated for inclusion. Inclusion criteria include ACO patients of CHS, age â‰¥ 18 years old, and on warfarin therapy for â‰¥ 6 months. Select INR values of patients were excluded from evaluation, such as values that were within the first 30 days of warfarin initiation, and values during temporary planned interruptions. Diagnostic and billing codes were utilized to determine patient outcomes. The primary objective is the difference in cost to the organization. The secondary objectives are the time in therapeutic range (TTR) on warfarin therapy, incidence of major or minor bleeding events, venous thromboembolisms that develop or progress during therapy, and a resource utilization composite outcome. The composite outcome includes evaluation of hospitalizations, urgent care visits, emergency department visits, and costs related to warfarin use and management.
Results and Conclusions to be presented at the Great Lakes Pharmacy Residency Conference.
Learning Objectives:
Discuss the goals of ACOs and the significance of providing quality care for ACO patients
Recognize the importance of time in therapeutic range in patients on warfarin therapy
Self Assessment Questions:
What role(s) may a pharmacist have within an ACO?
A. Improve clinical outcomes
B. Independently manage patient therapy
C. Optimize medication therapy
D. Both A and C are correct
How would you define time in therapeutic range (TTR)?
A. Average number of days that a patientâ€™s INR was in therapeutic range
B. Average number of weeks that a patientâ€™s INR was in therapeutic range
C. Percentage of time that a patientâ€™s INR was in therapeutic range
D. Percentage of patientâ€™s overall INR values that are within therapeutic range
Q1 Answer: D Q2 Answer: C

Characterization of Loop Diuretic Use in Critically Ill Trauma Patients with Positive Fluid Balance
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aggressive resuscitation has been linked to adverse outcomes. Loop diuretics have been utilized as a tool for deresuscitation, however, an underrepresentation of trauma patients in existing literature leaves little guidance for the practice of deresuscitation in this population. As an independent predictor of survival, achieving a negative fluid balance in mechanically ventilated patients by optimizing diuretic therapy is crucial for improving patient outcomes. This descriptive study aimed to assess improvement in oxygenation as a response to diuretic therapy in mechanically ventilated trauma patients.

Methods: This was a single-center, retrospective, descriptive study of adult trauma patients admitted to the ICU at UofL Health â€“ UofL Hospital between August 1, 2016, and June 30, 2022. Mechanically ventilated patients with a positive fluid balance who received loop diuretics were evaluated for inclusion. Patients were excluded if they had a history of heart failure, end-stage renal disease or a serum creatinine >2 mg/dL, were pregnant, incarcerated, or were transferred from an outside hospital. The primary objective of this study was to describe loop diuretic dosing practices in critically ill trauma patients and to identify overall rate of response and potential predictors of response to diuretic therapy. Response to therapy was defined as an increase in PaO2:FiO2 ratio by >20% or liberation from mechanical ventilation within 6-24 hours of diuretic dose. Secondary endpoints included net fluid balance prior to initial diuretic dose through 24 hours post-dose (mL), ICU length of stay (days), duration of mechanical ventilation (days), and ICU mortality.

Results/Conclusions: Data collection and analysis is ongoing. Results and conclusions to be presented at Great Lakes Pharmacy Residency
Learning Objectives:
Review current evidence for deresuscitation using loop diuretics in critically ill patients with a positive fluid balance.
Explain physiological detriments of fluid overload in critically ill trauma patients.
Self Assessment Questions:
Which of the following is a proposed benefit of deresuscitation with loop diuretics in critically ill patients with a positive fluid balance?

A. Maintaining a supraphysiologic mean arterial pressure
B. Prolonged recovery time while mechanically ventilated
C. Reduction in electrolyte replacement requirements
D. Decreased oxygen requirements

Current literature suggests excessive fluid administration in trauma patients may lead to which of the following outcomes?
A. Reduced incidence of coagulopathies
B. Pulmonary edema and increased work of breathing
C. Increased gastrointestinal motility
D. Improved cognition

Q1 Answer: D Q2 Answer: B

Evaluation of the Efficacy of basal vs basal/bolus insulin post-discharge for insulin naÃ¨ve patients

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Purpose:â€¨Worldwide, diabetes is a significant cause of mortality and morbidity. Type 2 diabetes accounts for 95% of all diabetic cases and is characterized by the progressive loss of functional beta cells in the pancreas, leading to a hyperglycemic state. Diabetes is the most expensive chronic condition in our nation; $1 out of every $4 in the United States healthcare costs is spent on caring for people with diabetes. To date, randomized controlled trials have shown basal-bolus insulins provide better glycemic control in non-critically ill hospitalized patients. This study examines the efficacy and safety of basal vs basal/bolus insulin post-discharge for insulin naÃ¨ve patients.

Methods:â€¨This study is a retrospective chart review of patients with type 2 diabetes admitted to Henry Ford Health from January 2021 onwards who are discharged on a new start insulin regimen. Patients were excluded if they did not have a follow-up A1C within six months of discharge or had no follow-up assessment at an associated Henry Ford ambulatory clinic. Furthermore, the efficacy and safety of basal vs basal/bolus insulin regimens were studied.â€¨ The primary outcome is the absolute reduction in A1C post-6-month discharge on a basal vs basal/bolus insulin regimen. Secondary outcomes within this study include identifying the number of hypoglycemia events within 6 months post-discharge, change in therapy from discharge to follow-up, assessing whether transition of care activities were performed, identification of adherence barriers at follow-up visits and the percentage of discharge cost inquiries performed.

Results/conclusion: Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference

Learning Objectives:

Review Guideline recommendations regarding when it is clinically appropriate to start type 2 diabetic patients on insulin regimens.
Discuss The safety and efficacy of utilizing basal vs basal/bolus insulin regimens.

Self Assessment Questions:

A 50-year-old patient, RM, presents to your clinic for a type-2 diabetes appointment. His goal A1C is <7%, and his A1C upon presenting to your clinic is 8.5%. He is currently on Metformin 1000 mg twice a day, Semaglutide 2 mg once weekly, and Empagliflozin 25 mg daily. Which of the following is an appropriate plan for RM?
A. Start patient on insulin lispro 4 units with lunch.
B. No changes are needed, repeat A1C is due within 6 months.
C. Consider adding pioglitazone 10 mg daily.
D. Add insulin glargine 10 units daily.

What is a common side effect of insulin therapy?
A. Hyperkalemia
B. Hypoglycemia
C. Weight loss
D. Hypernatremia

Q1 Answer: D Q2 Answer: B

Impact of a Nimodipine Dose Protocol on Clinical Outcomes in Aneurysmal Subarachnoid Hemorrhage

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Purpose: Nimodipine is the only medication FDA approved to improve neurologic outcomes and ischemic deficits after aneurysmal subarachnoid hemorrhage (aSAH). Treatment guidelines recommend initiating nimodipine after aSAH at a dose of 60 mg every-4-hours to be continued for 21 days. Due to the incidence of hypotension associated with nimodipine use, a nurse-driven protocol was developed at Norton Brownsboro Hospital to standardize the practice of holding or reducing nimodipine doses in response to hypotension or vasopressor use. This study compared outcomes before and after implementation of the protocol at a single community hospital.
Methods: All patients included in this retrospective chart review had a clinical diagnosis of aSAH and received at least one dose of nimodipine during hospital admission. Patients in the pre-implementation group received nimodipine for aSAH between July 1, 2017 and December 31, 2019. Patients in the post-implementation group received nimodipine for aSAH between March 1, 2020 and August 31, 2022. Patients less than 18 years of age, who were pregnant, or who died or received palliative care within 72 hours of admission were excluded. The primary objective was to compare rate of favorable discharge Modified Rankin Scale (mRS) in patients before and after implementation of the protocol. Secondary outcomes included: in hospital mortality, incidence of vasospasm, discharge location, length of ICU stay, length of hospital stay, percentage of nimodipine doses administered as 60 mg every-4-hours, percentage of nimodipine doses administered as 30 mg every-2-hours, percentage of nimodipine doses held, and vasopressor use during admission. Multivariate logistic regression was performed to identify factors associated with favorable discharge mRS.
Results/Conclusion: Results and conclusion will be presented at the Great Lakes Pharmacy Resident Conference

Learning Objectives:
Recognize the clinical complications of cerebral vasospasm and delayed cerebral ischemia after aSAH.
Identify the clinical impact of nimodipine in prior studies assessing its use in patients with aSAH.
Self Assessment Questions:
Which of the following is true regarding complications of cerebral vasospasm and delayed cerebral ischemia after aSAH?
A. Risk of vasospasm is highest within the first 3 days following aSAH.
B. Risk of vasospasm persists for months after aSAH.
C. DCI is associated with poor neurological outcome following aSAH.
D. Inflammation has no role in the development of vasospasm/DCI.
Nimodipine therapy in patients with aSAH has been associated with improvements in which of the following outcomes?
A. Reduced time to hospital discharge
B. Reduced incidence of poor neurological outcome
C. Reduced time on mechanical ventilation
D. All of the above
Q1 Answer: C Q2 Answer: B

Impact of an Outpatient Antimicrobial Stewardship Campaign on the Management of Acute Respiratory Infections (ARI)
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antibiotics are not indicated for most ARIs, unnecessary antibiotics are often prescribed, as studies have found that nearly half of antibiotics prescribed for ARIs may have been unnecessary. In an effort to reduce unnecessary antibiotic prescribing for ARIs, the Lexington Veterans Affairs Health Care System (VAHCS) implemented a facility-wide ARI campaign in November 2022 which included provider education and a clinical decision tool. The clinical decision tool consisted of a new ordering menu within the Computerized Patient Record System (CPRS) to assist providers in appropriately diagnosing and treating ARIs. This project aims to evaluate the impact of the ARI campaign on the prescribing rates of antibiotics for ARIs at this facility.

Methods: The ARI campaign was initiated with provider education in November 2022 and culminated with the ARI clinical decision tool ordering menu implementation on December 14, 2022. A retrospective cohort analysis was conducted to compare ARI management, including antibiotic prescribing rates, pre- and post-implementation of the campaign. A VA-wide â€¨ARI Patient Reportâ€™ dashboard was used to identify patients diagnosed with ARIs from 2/1/22 â€“ 3/31/22 (pre-campaign cohort) and 1/1/23 â€“ 1/31/23 (post â€“ campaign cohort) and a retrospective chart review was performed. The primary objective was a comparison in overall antibiotic prescribing rates for ARIs. Secondary objectives included a comparison of antibiotic prescribing rates for uncomplicated bronchitis and upper respiratory infections, as well as a comparison of preferred antibiotic prescribing for rhinosinusitis and pharyngitis.

Results and Conclusions: To be presented at the Great Lakes Pharmacy Resident Conference.
Learning Objectives:
Review the practice guidelines for the management of pharyngitis, bronchitis, and rhinosinusitis.
Discuss the prevalence of ARI in the United States.
Self Assessment Questions:
Per the 2012 Infectious Diseases Society of America (IDSA), purulent nasal drainage for _____ would support a diagnosis of bacterial rhinosinusitis.
A. >4 weeks
B. >10 days

C. <4 weeks
D. <10 days
The inappropriate treatment of ARI with antibiotics has the potential to lead to _____.
A. Increased healthcare costs
B. Decreased antimicrobial resistance
C. Decreased risk of Clostridioides difficile
D. Decreased risk of adverse effects from antibiotics
Q1 Answer: C Q2 Answer: A

Antimicrobial Therapy Evaluation in Patients with Gram-negative Bacteremia Secondary to UTI

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Gram-negative bloodstream infections (BSI) secondary to urinary tract infections (UTI) are one of the most common reasons for hospital admissions. Transition to oral antimicrobial therapy has been proven noninferior to continuing intravenous (IV) therapy and is associated with decreased cost, decreased hospital length of stay, and decreased risk of adverse events such as central line associated infection or catheter related thrombosis. The purpose of this project was to evaluate current treatment strategies being used for the treatment of gram-negative bacteremia secondary to uncomplicated UTI (uUTI) and identify if there are opportunities to improve practice within our community hospital.

Methods:
This project has been approved by Ascension Borgess Institutional Review Board and focused on Clinical Quality Improvement. This project is a retrospective chart review that will evaluate 200 patients, 18 years of age or older with a gram-negative bacteremia secondary to uUTI from July 1, 2018 to July 31, 2022. The primary endpoint of this study is to describe current regimens used for the treatment of gram-negative bacteremia secondary to uUTI. This project has multiple secondary endpoints including duration of therapy, length of hospital admission, and frequency of repeated blood cultures. Secondary safety endpoints including antimicrobial related adverse events, 30 day readmission rates, and Clostridium difficile infection rates will also be assessed. Data points that will be collected include patient demographics, clinical stability on admission including vitals and labs, as well as progression of clinical stability. Additionally, antimicrobial agents, duration of therapy, adverse events, length of hospitalization, and hospital readmission will also be collected. Outcomes measured on a nominal scale will be assessed using Chi-square or Fisherâ€™s exact test as appropriate and outcomes on a continuous scale that is normally distributed will be assessed using a studentâ€™s t-test, or Mann-Whitney U test for nonparametric data.

Learning Objectives:
Describe benefits of transitioning from intravenous (IV) to oral (PO) antimicrobial therapy
Identify oral agents proven to be effective in treatment of gram-negative bacteremia

Self Assessment Questions:
Which of the following is not a benefit of transitioning from IV to PO therapy?
A. Lower cost
B. Decreased risk of CLABSI or thrombophlebitis
C. Earlier discharge from the hospital
D. Increased antimicrobial resistance
Which of the following are NOT considered when choosing an oral antibiotic for step-down therapy in the treatment of gram negative bacteremia:
A. penetration
B. palatability
C. bioavailability
D. source control
Q1 Answer: D Q2 Answer: B

Advancing inpatient mental health treatment: Evaluating and enhancing current inpatient practice for patients requiring secondary mental health treatment in a small community hospital

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Within Vista Medical Center East, a small community hospital, the current protocol for patients with a mental health illness is reliant upon a team of physicians, pharmacists, and nursing personnel. At the time of the study, Vista Medical Center East did not have a medication reconciliation pharmacist. Currently, there is not an on-site psychiatric department, but are made available with the utilization of a consult.
Patients who develop a severe acute condition and have underlying chronic psychiatric needs, it is imperative to address their current home neuropsychiatric medication regimen. Due to the abrupt discontinuation of psychiatric medication, the risk of further deterioration of a patientâ€™s mental status increases. This may be caused by withdrawal symptoms from their current treatment, exacerbating anxiety, restlessness, psychosis, and sleep disturbances. Through this manifestation, the likelihood of agitation and/or delirium while hospitalized is increased. The purpose is to assess initiating patientâ€™s specific psychiatric home medication regimen within an appropriate time frame to increase patient improvement and decrease length of stay.

Assessment of patients with an acute severe condition on home neuropsychiatric medications that may need to be suspended due to drug interactions, acute care treatment superseding chronic treatment and determination of the need for chemical restraint. Assess the intervention of the timing of re-initiation of home neuropsychiatric medications and the correlation to length of stay. Establishment of best practice for patients requiring psychiatric needs for admittance, transfer to another facility, and discharge.

Learning Objectives:

Recognize The importance of a medication reconciliation pharmacist not only benefits patients during hospitalization, but also increases the likelihood of achieving goals of compliance and increased quality of life.
Identify Pharmacy's role within interprofessional care. Specifically, a re-assessment of best practice of consulting with a psychiatric department. The discussion concerns those patients with suicidal ideation, new diagnosis of a mental health illness, and if current home medication regimen is re-initiated and patient is controlled with positive treatment.

Self Assessment Questions:

AA is admitted to the hospital status/post Coronary Artery Bypass Graft Surgery with a past medical history of schizophrenia being treated with Risperidone 2 mg daily. All home medications have been discontinued 48 hours prior to surgery and patient is stable s/p CABG. What are the next preceeding steps for AA's care.

A. Re-assess patient's EKG
B. Restart risperidone as a slow taper to avoid withdrawal symptoms
C. Restart the full dose of risperidone
D. Since patient is currently stable, withhold antipsychotic regimen until day of discharge

Regards to the previous question, AA is on day 4 s/p CABG. He has become irate, hostile with nursing staff, and is displaying episodes of violence. What are AA's next steps for care?

A. Restart risperidone as a slow taper to avoid withdrawal symptoms
B. Restart the full dose of risperidone
C. Consult psychiatric department for re-assessment of home neuropsychiatric regimen.
D. Initiate Sertraline 25 mg daily.

Q1 Answer: A Q2 Answer: C

Impact of Clinical Decision Support Tools on the Optimization of Ceftriaxone Dosing in Patients with Bacteremia in a Rural Community Health System

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Current literature supports clinical decision support systems (CDSS) and their ability to provide real-time surveillance, increasing quality of care. In 2020, an alert in our CDSS was created identifying patients with positive blood cultures receiving ceftriaxone to prompt pharmacist review of the patientâ€™s antibiotic regimen and dosing. However, the impact of this alert on the optimization of ceftriaxone in these patients has not been analyzed.

Methods:
This retrospective cohort study involved cross-referencing reports of patients with a positive blood culture and an order for ceftriaxone from January 1, 2018 through June 30, 2019 (pre-CDSS) and January 1, 2021 through June 30, 2022 (post-CDSS). Adults who received empiric ceftriaxone therapy and had a positive blood culture with bacteria that ceftriaxone has activity against were included. The primary outcome was the incidence of appropriate antimicrobial optimization. Secondary outcomes included time from preliminary positive culture to optimization of antimicrobial regimen and final antibiotic regimen.

Results:
The four reports resulted in 21,121 positive blood cultures and ceftriaxone orders. After deduplication, 504 patients met inclusion criteria. After exclusion 71 (N) patients were included in the final analysis, 24 in the pre-CDSS cohort and 47 in the post-CDSS cohort. Patientsâ€™ ceftriaxone dosing or regimen were optimized significantly more in the post-CDSS cohort compared to the pre-CDSS (100% vs 87.5%, p = 0.035). Additionally, the time to dosing or regimen change, in hours, was significantly decreased in the post-CDSS cohort compared to the pre-CDSS (8.4 vs 22.3, p <0.001). The most common bacteria cultured was E. coli (49.3%). The top five final regimens were ceftriaxone 2g Q24H, vancomycin, ceftriaxone 1g Q12H, piperacillin/tazobactam, and cefazolin.

Conclusions:
This CDSS alert significantly increased the optimization of patientsâ€™ ceftriaxone dosing or antibiotic regimen and significantly decreased the time to optimization.
Learning Objectives:
Describe the utility of clinical decision support systems.
Identify literature surrounding optimal ceftriaxone dosing for patients with bacteremia.
Self Assessment Questions:
Which of the following is a disadvantage of clinical decision support systems (CDDS)?
A. Real time monitoring
B. Improved patient outcomes
C. Alert fatigue
D. Promoting patient safety
What ceftriaxone dosing regimen is recommended for patients with bacteremia in the absence of a CNS infection?
A. 2 grams IV every 24 hours
B. 1 gram IV every 24 hours
C. 1 gram IV every 8 hours
D. 2 grams IV every 12 hours
Q1 Answer: C Q2 Answer: A

Implementation of a Targeted Pharmacy Discharge Medication Review Pilot
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medications. A systematic review by Michaelsen et al found the range of patients experiencing discharge medication discrepancies was 20-87%, depending on variations in co-morbidities and number of medications prescribed. This large range highlights a need to create a targeted discharge medication review (DMR) to balance value with pharmacist time. The purpose of this quality improvement project is to identify high-risk patients for targeted DMR, demonstrate the benefit of pharmacist involvement with DMR, and improve transitions of care.
Methods: A DMR pilot was started at one rural Community Health Network hospital in Fall 2020. During this pilot, interventions were documented within the electronic medical record. Intervention data from January 2022 â€“ May 2022 was reviewed, and the top 5 medications or diseases requiring intervention were noted. These top 5 areas of intervention were use of anticoagulants, antibiotics, insulin, steroids, and patients with a CrCl < 30 mL/min. The purpose of identifying these interventions was to balance high impact areas with feasibility at a second pilot site. Following the data review, a second DMR pilot was started at an urban Community Health Network hospital in January 2023. This pilot targets patients discharging from a hospitalist service during clinical pharmacy service hours (Monday â€“ Friday 0800 â€“ 1600) who have one of the high impact medications or disease states. Patients transferring to another facility are excluded from this pilot. The primary aim of this quality improvement project is to review 50% of patients who have a medication that is at high-risk of being error prone at discharge while developing a process that balances this patient care need with pharmacist time.
Results and Conclusions: To be presented at Great Lakes Pharmacy Residency Conference.
Learning Objectives:

Recognize the potential benefits of implementing a pharmacy-led discharge medication review process
Discuss how the design of a targeted, pharmacy-led discharge medication review process relates to ISMP high-alert medications

Self Assessment Questions:

Which of the following is a potential outcome of implementing a pharmacy discharge medication review?
A. Increased medication discrepancies at discharge
B. Decreased preventable medication adverse events
C. Increased hospital length of stay
D. Decreased communication between providers and pharmacists

Which of the following medication classes is considered a high-alert medication in acute care, ambulatory, and long-term care settings by ISMP?
A. Oral antiarrhythmics
B. Inhaled corticosteroids
C. Anticoagulants
D. Antidepressants

Q1 Answer: B Q2 Answer: C

The Effectiveness of a Pharmacy Technician Retention Program within the Inpatient and Outpatient Pharmacy Departments of a Tertiary Medical Center

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Purpose: The study aims to assess the effectiveness of an employee retention plan within the pharmacy department of a metropolitan tertiary medical center. The primary endpoint is to assess change in pharmacy technician staff turnover from baseline to completion of all employees that partake in the annual Stay Touchpoints. These are open, one-on-one discussions between the employee and the member of administration team. The discussions are not performance driven and are designed around open-ended questions that are centered around the employeeâ€™s ideas and experiences. The secondary endpoint is to gauge pharmacy department culture, discover areas of departmental improvement, identify factors affecting pharmacy staff turnover/retention, and a cost analysis of onboarding a new pharmacy technician. Methods: This quality improvement study is a prospective analysis of Stay Touchpoints conducted by participating pharmacy technician staff in the Stay in VA retention program at the Veteran Health Indiana Medical Center from August 1, 2022, to March 1, 2023. Pharmacy staff will be included if they are employed by VHI and are willing to participate in Stay in VA Retention Program and partake in Stay Touchpoint discussions. Pharmacy staff that wish to opt out of the Stay in VA Retention Program or have human resource communications outside of the Stay Touchpoints and/or Pharmacy Service Climate Voice of the Customer will be excluded. Results/Conclusions: Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss factors affecting Pharmacy Technician turnover and retention.
Recognize opportunities to prevent Pharmacy Technician turnover, improve employee engagement, and cost savings of retaining valued staff.

Self Assessment Questions:

Which of the following is the best way to retain employees?
A. Weekly interactions
B. Closed-door policy
C. Helping staff set and achieve goals
D. Placing a larger work burden on the employee

What are the timings for the Stay Touchpoints (the open, one-on-one discussions between the employee and member of administration team)?
A. 30 days
B. 90 days
C. Annual
D. All of the above

Q1 Answer: C Q2 Answer: D

Implementation of an Ambulatory Pharmacy Dashboard: Financials & Key Performance Indicators

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Purpose: Although the concepts of revenue cycle and key performance indicators (KPIs) are nothing new within health systems and pharmacies departments, one of the biggest issues faced is data disparity. Key pieces of data needed to track a pharmacy departments performance are often scattered across multiple different systems that do not effectively communicate with one another. Making it difficult to efficiently compile, analyze, and share results on an organizations key performance metrics. Health systems are creating strategic plans that emphasize dedicating resources to monitoring and managing key metrics through dashboards. Dashboards are information management tools that help organizations visually track, analyze, and display metrics. At the University of Wisconsin (UW) Health, the ambulatory pharmacy department is currently lacking a standardize, single location to review key metrics.

Methods: The current data collection process for financial and KPI metrics was reviewed within the ambulatory pharmacy space to understand what metrics were being collected and how data was being processed. A workgroup of key stakeholders was formed to discuss financial and KPI metrics to be included in the ambulatory pharmacy dashboard, the platform used to house the dashboard, and target goals for each metric displayed. To ensure sustainability of the dashboard, the first phase of the build focused on the data stream to automate the process of uploading information to the dashboard. Then, phase two of the build focused on creating an intuitive interface with graphical displays and drill-down features. Upon dashboard completion, a process was established for reviewing and acting on metrics that exceed their predefined bounds.

Results/Conclusion: To be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Explain the prioritization of revenue cycle and key performance indicator metrics to be included in an ambulatory pharmacy dashboard.

Describe the different steps necessary to automate the flow of data into a dashboard.

Self Assessment Questions:

Which of the following are important factors to consider when building an ambulatory pharmacy dashboard?

A. Automating the data stream

B. Data drill down capabilities

C. Establishing a review process

D. All of the above

Which of the follow metrics were NOT included as one of â€œbaseline metricsâ€?

A. Gross revenue

B. Prior authorizations

C. Operating expenses

D. Accounts receivable > 60 days

Q1 Answer: D Q2 Answer: B

Investigating the Underutilization of GLP-1 Receptor Agonists and SGLT-2 Inhibitors in Patients with Type 2 Diabetes

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Introduction:

Research has shown that specific classes of diabetes medications have added benefits such as cardiovascular and renal protection. These include glucagon-like peptide 1 (GLP-1) receptor agonists and sodium-glucose cotransporter-2 (SGLT-2) inhibitors. GLP-1 receptor agonists, SGLT-2 inhibitors, liraglutide, dulaglutide, semaglutide, empagliflozin and canagliflozin are known to offer reductions in major adverse cardiovascular events outcomes.

Method:

A retrospective electronic chart review was performed to extract information about patients with Type 2 Diabetes Mellitus (T2DM) and atherosclerotic cardiovascular disease (ASCVD), congestive heart failure (CHF), and/or chronic kidney disease (CKD) at Veteran Health Indiana who were not prescribed a GLP-1 receptor agonist or a SGLT-2 inhibitor between January 1st, 2020 and December 31st, 2021. To simplify the analysis, a 200-patient sample was selected using a random number generating tool. The primary outcome is to determine the percentage of veterans who could have potentially benefited from a GLP-1 receptor agonist or a SGLT-2 inhibitor prescription.

Learning Objectives:

Identify the Underutilization of GLP-1 Receptor Agonists and SGLT-2 Inhibitors in patients

Explain some of the underline reasons behind the limitation in prescribing GLP-1 Receptor Agonists and SGLT-2 Inhibitors

Self Assessment Questions:

Who can prescribe GLP-1 Receptor Agonists and SGLT-2 Inhibitors for patients

A. Ambulatory care providers

B. Cardiology providers

C. Endocrinology providers

D. All of the above

Reasons for Underutilization of GLP-1 Receptor Agonists and SGLT-2 Inhibitors in patients
A. Recently added to the VA national formulary
B. Lack of understanding about GLP-1 Receptor Agonists and SGLT-2 Inhibitors benefits
C. Identifying GLP-1 Receptor Agonists and SGLT-2 Inhibitors as diabetes treatment only
D. All of the above
Q1 Answer: D Q2 Answer: D

Implementation of revised hospital protocols for Diabetic Ketoacidosis (DKA) and Hyperglycemic Hyperosmolar State (HHS) to improve patient outcomes through improved nursing autonomy

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Diabetic Ketoacidosis (DKA) has incidence ranges on average from 0-56 per 1000 person-years.1 Hyperglycemic Hyperosmolar State (HHS) accounts for <1% of diabetes-related hospital admissions.2 Inversely, the mortality rates of DKA are <1% while mortality rates in HHS are 10-20%.2,3 Due to the acute metabolic complications of these disease states patients require close monitoring and high-quality care especially upon initial presentation to the hospital. While strictly following the American Diabetes Association (ADA) guidelines, this study looks to create a revised DKA/HHS protocol to supplement nursing autonomy to further improve patient outcomes.

A pre-intervention and post-intervention survey was conducted on nursing staff who manage DKA/HHS patients in the emergency department (ED), intensive care unit (ICU), and medical stepdown unit. The surveyâ€¯assessed the comfort and confidence of nurses to utilize recommendations, especially outside the clinical pharmacistsâ€™ working hours. The primary intervention was the implementation of a revisedâ€¯DKA/HHS management protocol. The studyâ€™s primary outcomes were the rate of DKA/HHS resolution, cost savings, and prevention of hypoglycemic episodes. The resolution of DKA is defined as blood glucose <200 mg/dL, serum bicarbonate â‰¥15, venous pH >7.3, and anion gap â‰¤12 mEq/L.3 The resolution of HHS is defined as mental alertness, blood glucose <300 mg/dL, and serum osmolality <320 mOsm/kg.3 Cost savings and incidence of hypoglycemia were evaluated before and after implementation of the revised protocol. Cost savings were measured by ICU length of stay (LOS) while in DKA/HHS. A hypoglycemic episode was defined as a blood glucose level of <70 mg/dL.4 The secondary outcome assessed nursing autonomy while providing efficient care, using the pre-intervention and post-intervention surveys.

Following our February Pharmacy and Therapeutics meeting, this new protocol will be implemented. There is no preliminary data currently however, we intend to show reductions in time to resolution, cost, and hypoglycemic episodes.

Learning Objectives:
Review the differences in pre-implementation and post-implementation populations
Discuss the implications of the data and results of the new protocol

Self Assessment Questions:
Who benefits from a streamlined healthcare process?
A. The patient
B. Nurses
C. Providers
D. All of the above
Where would you go to find guidelines to treat DKA/HHS?
A. The FDA
B. The ADA
C. The NRA
D. The IRA
Q1 Answer: D Q2 Answer: B

Comparison of the effect of BRAF/MEK inhibitor combinations adverse event profiles on the durability of therapy: an analysis of adverse event mediated discontinuation rates and duration of therapy

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Late-stage cutaneous melanoma has long been considered a difficult-to-treat cancer, and refractory to most traditional chemotherapy regimens. Over the past decade, immunotherapy and oral molecularly targeted therapies have been introduced, completely changing the cutaneous melanoma treatment landscape. Of these new oral therapies are those that target oncogenic proteins BRAF and MEK have become standard of care for patients with cutaneous melanoma with V600E/K mutations. Vemurafenib/cobimetinib, dabrafenib/trametinib, and encorafenib/binimetinib (FDA-approved BRAF/MEK inhibitors) have each demonstrated improved progression-free survival and 5-year survival when compared to historical care, however each combination is associated with unique and adverse events. Commonly associated adverse events with BRAF/MEK inhibitors are prolonged pyrexia, cardiac and hematologic toxicities, GI toxicities, retinal detachments, and secondary cutaneous malignancies. While the combination of BRAF and MEK inhibitors together lower the risk of cutaneous toxicities compared to BRAF monotherapy, these regimens continue to present a challenge for patients to endure, often resulting in discontinuations or dose reductions. The aims of this research are to compare adverse events associated with each BRAF/MEK inhibitor combination and their effect on dose intensity and the duration of time on therapy in a real-world, single institution setting. This retrospective study compares the use of the aforementioned FDA-approved BRAF/MEK inhibitors in patients treated for stage III or IV cutaneous melanoma at University of Cincinnati (UC) Health between January 1, 2013 to June 30, 2022. Adverse events were compared by system: hematologic, gastrointestinal, dermatologic, ocular, and cardiac. Adverse events were categorized by grade, based on provider diagnosis or the Common Terminology Criteria for Adverse Events version 5 (CTCAE.v5). Statistical analysis was conducted using t-test or Wilcoxon Rank Sum, Fischerâ€™s exact test or Chi-Square test, Cox proportional hazards, and ANOVA or Kruskal-Wallis as appropriate.

Learning Objectives:

Review the epidemiology, prognosis, and most common treatments for metastatic melanoma.

Recall important considerations for combining MEK inhibitors with BRAF inhibitors.

Self Assessment Questions:

Which of the following is true regarding the treatment of metastatic cutaneous melanoma?

A. Surgical resection is the mainstay of treatment.

B. BRAF/MEK inhibitors are used in patients with BRAF WT and are associated with better outcomes than checkpoint inhibitor therapy.

C. BRAF/MEK inhibitors are well tolerated and used in combination with interleukin-6.

D. BRAF/MEK inhibitors are oral medications for patients with BRAF V600E/K mutations and may be dose reduced for specific adverse events.

In general, the combination of BRAF inhibitors with MEK inhibitors:

A. Increases gastrointestinal and hematologic side effects, but decreases cutaneous side effects.

B. Increases gastrointestinal side effects, but decreases hematologic and cutaneous side effects.

C. Decreases gastrointestinal and hematologic side effects, but increases cutaneous side effects.

D. Decreases gastrointestinal side effects, but increases hematologic and cutaneous side effects.

Q1 Answer: D Q2 Answer: A

Three things that are certain in life: death, taxes, and ESBL UTIs in the ED

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Purpose: Extended-spectrum beta-lactamase (ESBL) producing Enterobacterales commonly cause urinary tract infections (UTI) and are challenging to treat due to extensive antibiotic resistance. In community settings, such as the emergency department (ED), UTI antibiotic treatment is often prescribed preceding culture speciation which may result in inactive empiric therapy and subsequent patient harm. Few studies describe ESBL UTI management in the ED, which represents an opportunity for antimicrobial stewardship intervention. The purpose of this study is to describe empiric and definite antibiotic treatment for patients with ESBL UTIs in the ED and to compare patient outcomes.

Methods: This retrospective cohort study will evaluate outcomes of patients discharged from the ED with a UTI caused by an ESBL-producing uropathogen. Patient cohorts will be defined by patients who did and did not have an unplanned healthcare encounter within 30 days of their initial encounter. Patients â‰¥18 years old presenting to the ED with diagnostic criteria for a UTI with a urine culture resulting in a single ESBL-producing Enterobacterale will be included. Patients with altered mental status, a history of renal transplant or abnormal urinary tract or currently taking active antimicrobial therapy will be excluded. The primary outcome will be any unplanned healthcare encounter within 30 days of the initial visit. Secondary endpoints will include initial and definite antimicrobial therapy and any subsequent hospitalizations due to ongoing or worsening infection within 30 days. This study will include 162 patients, calculated by estimating 60% of patients will initially be prescribed inactive therapy. Statistical analysis will be conducted using Chi-Square test or Fisherâ€™s exact test for nominal data and studentâ€™s t-test and Mann Whitney U-test for continuous variables. Multivariable regression will be used to identify exposures independently associated with unplanned healthcare encounters.

Results and conclusions will be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the resistance patterns of ESBL producing Enterobacterales and the oral agents commonly effected.

Review appropriate antibiotic therapy for UTIs caused by ESBL-producing Enterobacterales using resulting culture susceptibility patterns.

Self Assessment Questions:

According to IDSA guidelines, what is the resistance prevalence threshold in which an antimicrobial agent is no longer recommended for empiric treatment of acute cystitis?
A. 0.25
B. 0.5
C. 0.15
D. 0.2
Which oral antibiotic would be most appropriate for empiric therapy when treating acute cystitis in a patient with a history of an ESBL-positive E. Coli UTI 3 months prior?
A. Cephalexin 500 mg every 6 hours for 7 days
B. Nitrofurantoin 100 mg every 12 hours for 5 days
C. Ciprofloxacin 500 mg every 6 hours for 5 days
D. Trimethoprim-sulfamethoxazole 160/180 mg every 12 hours for 5 days
Q1 Answer: D Q2 Answer: B

Drug Quality Screenings (DQS) of Critical Care Medications via Mass Spectrometry

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Background: Over the past three to four decades, increased globalized manufacturing has changed the pharmaceutical supply chain, which introduces risks to the U.S. drug supply chain, drug quality, and patient care. Given current FDA constraints and geopolitical risks, DQS mechanisms are needed in addition to current regulatory processes.
Purpose: To analyze potential drug quality issues in critical care medications through non-destructive testing given previous University of Kentucky Healthcare DQS findings.
Methods: Using Fourier transform near-infrared (FT-NIRT) and Raman spectrometry, medications are screened for quality concerns indicated by variability in absorbance peak intensities and locations. The selection of critical care medications was based off both civilian practice at a large academic medical center, as well as preferred medications from the Joint Trauma System (JTS) Clinical Practice Guidelines for military combat operations. Statistical analysis is performed via 3-D principal component plot and standard deviation variation.
Results: Data analysis in progress. 27 medications screened across 121 Lot numbers. Depending on availability, 6,12, or 18 vials/samples screened per lot number.
Conclusion: Results will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:
Discuss the impact of globalized manufacturing on pharmaceutical manufacturing, drug quality and patient care.
Describe non-destructive testing options for drug quality screening.
Self Assessment Questions:
What is not required on a stock pharmaceutical label?
A. Expiration Date
B. Manufacturer Country of Origin
C. Lot Number
D. Name
What are the two types of chemical analysis in drug quality testing?
A. Destructive and non-destructive testing
B. Raman and FT-NIR
C. Mass spectrometry and Gas chromatography
D. Crystallography and X-ray
Q1 Answer: B Q2 Answer: A

Evaluating the Impact of a Dedicated Outpatient infusion Pharmacist on Cost and Patient Safety

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Purpose: As infusion therapies for chronic diseases have become more common, there has been an increase across the country in outpatient infusion centers (OICs). These centers provide patients with the therapy they are prescribed, set up IV access, pre-treat when necessary, provide test doses, and handle infusion reactions or other emergency scenarios. Pharmacist involvement in these patientsâ€™ care, specifically medication management, has been shown to not only reduce costs significantly but also decrease the frequency of adverse events. Hospitals that manage onsite OICs should have procedures in place to ensure that patients receive the most appropriate treatment. A vital part of those procedures involves having a pharmacist verify the order to ensure the medication, dose, and route are correct in order to maximize patient safety and minimize cost. In an effort to utilize pharmacists to reduce healthcare costs and improve safety, Henry Ford Macomb Hospital approved the addition of a full-time OIC pharmacist in February of 2022. This dedicated pharmacist focuses solely on OIC prescription verification without additional inpatient responsibilities. The purpose of this study is to analyze the impact that a dedicated OIC pharmacist had on both cost and safety.â€¯â€¯

Methods: Data analysis will be conducted on 395 patients who received treatment from March 1st, 2022, to September 1st, 2022. Pharmacist interventions were evaluated and categorized based on the error or discrepancy identified. the outcome will be evaluated for impact on patient safety and overall healthcare cost.

Results/Conclusion: Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference

Learning Objectives:

Describe the benefits of having a dedicated outpatient infusion center pharmacist with respect to medication safety and cost

Identify the types of interventions that a dedicated outpatient infusion center pharmacist may have

Self Assessment Questions:

Which of the following is a benefit of having a dedicated outpatient infusion pharmacist?

A. Improve patient safety by identifying monitoring errors

B. Increase pharmacy profits

C. Decrease healthcare costs by preventing unnecessary doses

D. Both A and C

You receive a call from the outpatient infusion center stating that LK has arrived for her dose of Infliximab that she is supposed to receive every 6 weeks. As the pharmacist reviews the order, they see that the patients last dose was 5 weeks ago. They also notice that she has been receiving 15 mg/kg (600 mg) when the maximum suggested dose is 10 mg/kg (400 mg). They reach out to the provider who asks to reschedule the treatment for the following week and adjusts the dose to 400 mg. What type of intervention is this?

A. Patient safety

B. Cost savings

C. Both A and B

D. None

Q1 Answer: D Q2 Answer: C

Balancing Workload through Data Analytics: Integrating Shift Scheduling Software with Workload Metrics

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Purpose:

Current models for measuring pharmacy workload and productivity often have the main limitation of being unable to capture the key components of clinical pharmacy workflow. Efforts to effectively measure workload have been described since the 1960s, however most of these workload measures rely on components of workflow reliant on simple labor or cost outputs. With the introduction of a pharmacy-owned and maintained database, the possibility of workload analytics into measuring key steps in both clinical and operational pharmacy workflows have been made possible. In this pre-post observational study we created a workload analytics model that combines shift data elements from scheduling software with electronic medical record (EMR) data elements to create real-time visualizations of pharmacist workloads.

Methods:

Shift scheduling data elements from tcp HumanityÂ® software and the EpicÂ® Clarity database was extracted and loaded into PharmDW, an institutional pharmacy data warehouse. From the warehouse, data from the EMR (i.e. iVents, notes, and verification data) were given workload weights via institutional expert consensus to create a total effort value. An effort per hours worked ratio was then calculated for each EMR data element: iVents, notes, and verifications to measure pharmacy productivity. Pharmacy productivity scores and data from PharmDW was then extracted and used in TableauÂ® visualizations.

Results & Conclusions to be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Discuss the need for an effective workload analysis within health systems

Explain the methods to adequately and accurately measure workload

Self Assessment Questions:

What is NOT a benefit of effective workload analysis within health systems?

A. The ability to redistribute workload more evenly across pharmacy workflows
B. Providing a comparator inside, and outside of health systems for adequate staffing levels
C. Measuring pharmacist intervention and service value within health institutions
D. Justify the termination of unpopular pharmacy services

Which is an example of a "Cost-Based" productivity ratio?
A. Hours worked per patient discharge
B. Full-time equivalents per order processed
C. Total pharmacy spending per 100 orders processed
D. Hours paid for per 100 orders processed

Q1 Answer: D Q2 Answer: C

Optimizing Urine Culture Utilization in the Emergency Department

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Purpose: Overutilization of urine cultures can be a patient safety concern as it is linked to overuse of antibiotics for asymptomatic bacteriuria. As such, urine culture stewardship is an important component of antimicrobial stewardship and infection prevention programs. In addition, when urine cultures are ordered and performed on patients without signs and symptoms of infection, it can lead to an increased resource utilization for lab personnel, providers and pharmacists reviewing cultures and even confusion for patients. Columbus Regional Hospital currently utilizes a urinalysis with reflex to culture approach with a broad reflex to culture list of parameters: WBC >5, leukocyte esterase positive, nitrite positive or bacteria â‰¥ 1+. The purpose of this study is to adjust the current reflex to urine culture parameters at Columbus Regional Hospital to be more specific to patients with true infection and to therefore decrease the amount of urine cultures performed.

Methods: This single-center, prospective, quasi-experimental study conducted at Columbus Regional Hospital includes all patients that had a Urinalysis with Reflex to Urine Culture if Positive, Urinalysis with Microscopy and Reflex to Urine Culture if Positive and/or a Urine Culture completed. Data was collected prior to implementation from September 4, 2022 â€“ September 10, 2022 and will be collected post-implementation with dates determined after implementation. At implementation, the urine reflex to culture criteria will be adjusted to only require WBC>10 to reflex in place of current parameters of WBC >5, leukocyte esterase positive, nitrite positive or bacteria â‰¥ 1+. The primary endpoint for analyzing this intervention will be the number of urine cultures completed, measured by cultures/week.

Results/Conclusion: Results and Conclusion will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Review published guidelines for the treatment of asymptomatic bacteriuria.
Explain how unnecessary urine cultures can hinder patient care and cause downstream effects.

Self Assessment Questions:

According to the Infectious Diseases Society of America (IDSA) guidelines, in what case below should bacteriuria be treated?
A. Patient is experiencing back pain.
B. Patient is hCG(+).
C. Patient is confused.
D. Patient is drowsy.

What are factors associated with overutilization of urine cultures?
A. Unnecessary antibiotic use
B. Confusion for patients
C. Increased resource utilization for lab personnel
D. All of the above

Q1 Answer: B Q2 Answer: D

Evaluating the Effects of Capping Emergency Department Heparin Boluses for STEMI Patients Undergoing Percutaneous Coronary Intervention

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Purpose: The gold standard treatment for patients presenting with a STEMI is primary percutaneous coronary intervention (PCI). Heparin boluses are administered in the Emergency Department (ED) prior to a PCI. Heparin is monitored for effectiveness via an intraprocedural activated clotting time (ACT). There are no strong guidelines on whether heparin boluses should be capped for PCI. The studyâ€™s primary objective is to determine the safety and effectiveness of a â€œcappedâ€ versus â€œuncappedâ€ bolus for patients presenting with a STEMI and undergoing PCI by comparing the percent of patients with a first in-range ACT.

Methods: This research is a retrospective evaluation of the safety and efficacy of various heparin bolus caps in patients presenting to the St. Joseph Mercy Ann Arbor ED between January 2018 and December 2022 with a STEMI undergoing PCI. Patients are excluded if they were diagnosed with a NSTEMI/unstable angina, if they received Tenecteplase, if they went into cardiac arrest prior to cardiac catheterization, if they did not receive a heparin bolus, or if they were transferred. The data for our study will be pulled from the Blue Cross Blue Shield of Michigan Cardiovascular Consortium (BMC2) and the hospitalâ€™s electronic medical records (Epic and Cerner). BMC2 is a multicenter quality improvement registry for cardiovascular patients across the state of Michigan. The primary objective, percent of patients with a first in-range ACT, will be evaluated while controlled for comorbidities, medications prior to admission, and presentation time. The studyâ€™s secondary analysis includes the incidence of major adverse cardiovascular events at discharge and 30 days, 3a-category bleeding on the Bleeding Academic Research Consortium scale at discharge, the incidence of in-stent thrombosis, the duration of hospitalization, the incidence of readmission within 30 days, and in-hospital mortality post-STEMI.

Results/Conclusions: The final results will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss the current guidelines and literature of initial STEMI management.

Describe the safety outcomes of STEMI patients who underwent a PCI and received a small, initial heparin bolus versus those who received a large, initial heparin bolus.

Self Assessment Questions:

What is the gold standard treatment for STEMI management?

A. Primary percutaneous coronary intervention
B. Fibrinolytics
C. Anticoagulation alone
D. GP IIb/IIIa inhibitors

According to the ACCF/AHA guidelines, what is the recommended heparin bolus to STEMI patients before a PCI if no other anticoagulants/antiplatelets are administered?

A. 30-50 units/kg
B. 40-60 units/kg
C. 50-70 units/kg
D. 70-100 units/kg

Q1 Answer: A Q2 Answer: D

Evaluation of oral versus intravenous vitamin K for the management of coagulopathy of liver disease

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Vitamin K dependent clotting factors are often reduced in the setting of liver dysfunction, reflected by an elevated INR. Poor dietary intake and reduced absorption increase concern for vitamin K deficiency in patients with liver dysfunction. Out of concern for elevated INR and liver dysfunction, supplemental vitamin K may be administered to augment vitamin K-dependent clotting factor production and decrease risk of bleeding. There is controversy regarding the most effective route of vitamin K administration. Oral administration lacks adverse effects associated with intravenous administration. Intravenous administration has faster onset and peak effect and circumvents need for absorption from the GI tract, a potential benefit over oral therapy. However, studies comparing oral and intravenous vitamin K for anticoagulation reversal show no difference in 24-hour INR reduction. There is a paucity of evidence evaluating the effect of oral and intravenous vitamin K in patients with elevated INR due to coagulopathy of liver disease.

This retrospective, single-health system study compares patients with liver-associated coagulopathy, matched based on initial INR, who received oral or intravenous vitamin K. The primary outcome is the change in INR from day of initial vitamin K dose to 72 hours post-dose. The study includes adult patients with liver dysfunction and INR â‰¥1.8. Patients were excluded for receipt of anticoagulants or blood products that may alter INR and comorbid bleeding or coagulopathic disorders. Secondary analyses include change in INR based on dosing strategy, bleeding/clotting events, and predictors of INR response.

Institutional Review Board approval was obtained, and data collection is in progress. Final results will be presented at the Great Lakes Pharmacy Residency Conference in the spring of 2023.

Learning Objectives:

Describe how hemostatic factors are impacted by liver dysfunction

Identify 2.Discuss the methods of a residency research project on oral versus intravenous administration of vitamin K for coagulopathy of liver

Self Assessment Questions:

Which of the following correctly describes how liver dysfunction impacts factors involved in hemostasis

A. Decreased in platelets due to direct reduction in platelet synthesis in the liver
B. Increase in the natural anticoagulants, proteins C&S
C. Increase in von Willebrand factor
D. Decrease in factor VII

What is the primary endpoint of the residency research project described in this presentation?

A. INR at 72 hours post-initial dose of vitamin K
B. Mortality
C. MELD at 72 hours post-initial dose of vitamin K
D. Incidence of bleeding events

Q1 Answer: C Q2 Answer: A

Differences in Kidney Function Impairment in Lupus Nephritis Based on Treatment

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Lupus nephritis (LN) is the most common serious manifestation of systemic lupus erythematosus (SLE), up to 60%, that disproportionately affects people of Black race and Hispanic ethnicity. LN is the leading cause of kidney failure requiring dialysis or transplant. The treatment approach for LN is evolving and more information is required regarding the impact of different treatment approaches on LN outcomes. Moreover, adverse social determinants of health could interact with biological factors leading to poor outcomes. Thus, it is important to: a) perform descriptive analysis of kidney disease outcomes in patients with LN over time and b) longitudinally examine the factors, including treatment approach, that determine poor kidney disease outcomes in LN.

Methods

Data including socio-demographics, histopathological findings, medication use, social determinants of health, and laboratory values will be abstracted from 241 validated incident LN patients. GFR will be collected at the index LN biopsy through up to 10 years of follow up to determine kidney function impairment. Variables that can impact kidney function including serum albumin, urine protein creatinine ratio, medication regimen, demographics, adverse social determinants of health, etc. will be examined to determine predictors of kidney function impairment in LN.

Anticipated Results

The primary outcome will assess kidney function impairment in LN patients defined as progression to CKD stage â‰¥3 or â‰¥30% decline in GFR compared to baseline confirmed by â‰¥3 determinations over â‰¥3 months. Using Cox-proportional hazards model, CKD progression in LN over time and factors that determine CKD progression over time will be analyzed.

Learning Objectives:

Describe kidney disease course over time in patients with lupus nephritis.
Recognize differences in the treatment approach of lupus nephritis by adverse social determinants of health and racial groups, and how those treatment options impact kidney disease outcomes by racial group and adverse social determinants of health.

Self Assessment Questions:

What percentage of patients with systemic lupus erythematosus could develop lupus nephritis?

A. 0.1
B. 0.25
C. 0.45
D. up to 60%

Which of the following demographics experiences a higher prevalence lupus nephritis?

A. Black race
B. Hispanic ethnicity
C. All of the above
D. Neither of the above

Q1 Answer: D Q2 Answer: C

Comparison of Two Testing Strategies for Mycoplasma genitalium in Emergency Department Patients

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Purpose: Mycoplasma genitalium is a sexually transmitted infection (STI) that has an estimated prevalence of 0.7-3.3%. The Centers for Disease Control and Prevention (CDC) 2021 STI Treatment Guidelines only recommend testing for Mycoplasma genitalium in certain circumstances. The test for detection of Mycoplasma genitalium became available to the health system studied in February 2022. The purpose of this study is to compare the appropriateness of Mycoplasma genitalium treatment based on CDC recommendations in two cohorts that utilized different testing strategies.
Methods: This study is a retrospective, multicenter, pre- and post-intervention cohort study that will assess adherence to CDC recommendations for appropriate management of Mycoplasma genitalium in patients discharged from the emergency department (ED). In the first cohort, which includes patients evaluated from May 2022 to August 2022, Mycoplasma genitalium was included on the standard STI testing panel. In the second cohort, testing for Mycoplasma genitalium was optional, and a testing algorithm based on CDC recommendations was provided to ED sites. The electronic medical record was used to identify patients tested for Neisseria gonorrhoeae and Chlamydia trachomatis who had a visit at 15 ED locations within a large health system. Subjects were excluded if they were pregnant, sexually assaulted, or had indeterminate STI results. The primary endpoint is the percentage of subjects managed appropriately for Mycoplasma genitalium in accordance with CDC recommendations. Secondary endpoints include overall prevalence of Mycoplasma genitalium in patients who presented to ED sites and prevalence in ICD-10 code diagnosed PID.
Results: Based on preliminary data for the primary endpoint, 78.4% of subjects who tested positive for Mycoplasma genitalium were managed appropriately. Regarding preliminary data for secondary endpoints, 13.1% of subjects from the pre-intervention cohort tested positive for Mycoplasma genitalium.
Conclusions: Final results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.
Learning Objectives:
Review the Centers for Disease Control and Prevention (CDC) recommendations for testing and treatment of Mycoplasma genitalium
Identify the preferred treatment for Mycoplasma genitalium infection when resistance testing is unavailable
Self Assessment Questions:
According to the CDC, testing for Mycoplasma genitalium is not specifically recommended in which of the following patients?
A. A male patient with recurrent nongonococcal urethritis
B. A female patient with recurrent cervicitis who has failed treatment for other STIs
C. A female patient with symptomatic pelvic inflammatory disease
D. An asymptomatic male patient who requests STI screening
What is the preferred treatment recommended by the CDC for Mycoplasma genitalium infection when resistance testing is unavailable?
A. Doxycycline 100 mg orally twice daily for 14 days
B. Doxycycline 100 mg orally twice daily for 7 days, followed by azithromycin 1 g orally on day 1, followed by 500 mg once daily for 3 additional days
C. Doxycycline 100 mg orally twice daily for 7 days, followed by moxifloxacin 400 mg orally once daily for 7 days
D. Azithromycin 500 mg orally on day 1, followed by 250 mg once daily for 4 additional days
Q1 Answer: D Q2 Answer: C

Evaluating the use of empagliflozin for diabetes management in Veterans with CKD: a retrospective chart review
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Purpose: The study will view benefits of empagliflozin in a specific patient population at the Hershel â€œWoodyâ€Williams VA Medical Center. The purpose is to view effectiveness of empagliflozin on A1c in those with chronic kidney disease (CKD) .
Rationale: More than 37 million Americans have diabetes, with 90-95% having type 21. When choosing medications, a patientâ€™s comorbidities are important. Guidelines suggest the therapy depends on comorbidities, management needs, and patient-centered treatment factors2. Around 1 in 3 adults with diabetes has CKD3. Sodium-glucose co-transporter-2 (SGLT-2) inhibitors prevent reabsorption of filtered glucose from tubular lumen. Approved SGLT-2â€™s are canagliflozin, dapagliflozin, empagliflozin, and ertugliflozin. Empagliflozin used for formulary purposes. Guidelines state empagliflozin is viewed when one has/is high risk for atherosclerotic cardiovascular disease, heart failure, and/or CKD2. The EMPEROR-Reduced trial showed in addition to benefits for HF patients, empagliflozin slowed decline in kidney function in those with/without diabetes4.
Procedure: Retrospective chart review conducted on those with type 2 diabetes and Stage 3 CKD who started empagliflozin between January 1, 2015 and October 1, 2022. Data obtained by VHA Corporate Data Warehouse (CDW) and stored on VA Informatics and Computing Infrastructure (VINCI) server. The primary outcome is to view change in A1c in those with Stage 3b CKD (EGFR 30-44) compared to Stage 3a (EGFR 45-59) after 12 months. Secondary outcomes are effects on renal function, weight, blood pressure, side effects, and cardiovascular events.
Risks/Benefits
Possible benefits include improvement in diabetes management, A1c, and slowed progression of CKD. Possible risk would be compromise of patient data.
Inclusion/Exclusion Criteria
Inclusion:
â€¢18-89 years old
â€¢Started on empagliflozin for type 2 diabetes by VA provider
â€¢Initial A1c between ï‚³7% and <10%
â€¢Initial EGFR between 30 and 59 ml/min/1.73m2
Exclusion:
â€¢Type 1 diabetes
â€¢ESRD requiring dialysis
â€¢Pregnant/nursing
â€¢Empagliflozin allergy
â€¢Prescription discontinued prior to 12 months of therapy

Learning Objectives:
Recognize empagliflozin's role in those with type 2 diabetes and chronic kidney disease
Discuss potential side effects related to empagliflozin when using as a treatment for type 2 diabetes
Self Assessment Questions:
Which of the following is the maximum daily dose of empagliflozin for treatment of type 2 diabetes?
A. 10mg
B. 25mg
C. 20mg
D. 12.5mg
Which of the following are NOT expected while taking empagliflozin?
A. Urinary tract infections
B. Increased thirst
C. Genital fungal infections
D. Decreased urination
Q1 Answer: B Q2 Answer: D

The Great Methotrexate Debate: Impact of Serum Discharge Level
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Methotrexate, an antifolate, is one of the most widely used anticancer agents. High-dose MTX (methotrexate â‰¥ 500 mg/m2) as a prolonged intravenous infusion is an integral part of treatment regimens for a variety of malignancies, including acute lymphoblastic leukemia, lymphoma, and osteosarcoma. Nephrotoxicity is an important concern and close monitoring of levels is instituted to ensure clearance. Standard supportive care consists of vigorous hydration, urine alkalinization, and leucovorin, which can enhance the solubility of methotrexate in the urine and prevent toxicity. When originally approved, the product label for MTX used 0.05 Î¼M as the threshold to discontinue supportive care. More recently, studies have been published using a threshold of 0.1 Î¼M for discharge. After an assessment of drivers of hospital length of stay, it was identified by the inpatient hematology/oncology optimization group that discharge criteria among patients receiving HD-MTX was an actionable factor. In 2021, Henry Ford Health developed a workflow to discharge patients with 2 days of oral leucovorin when the methotrexate level reached < 0.2 Î¼M. This study evaluates the implementation of a lenient discharge methotrexate level, changing the threshold from 0.1 Î¼M to 0.2 Î¼M.

This is a single center, retrospective, quasi-experimental study with two groups: methotrexate discharge level < 0.1 (January 1, 2021 through October 1, 2021) and discharge level < 0.2 (October 1, 2022 through August 1, 2022). Patients were included if they were electively admitted to receive high-dose methotrexate. The primary endpoint is hospital length of stay. Secondary endpoints are total cost of hospital stay, composite of methotrexate toxicity on day 1 of subsequent cycle, delay in subsequent chemotherapy cycles, and hospital admission due to methotrexate-related toxicity prior to subsequent cycle.

Results and conclusions to be presented at GLPRC.

Learning Objectives:

Describe standard supportive care during high-dose methotrexate administration

Recognize prevention and management of methotrexate toxicities

Self Assessment Questions:

Which of the following is not a toxicity associated with high-dose methotrexate?

A. Nausea & vomitting

B. Renal impairment

C. Ototoxicity

D. Bone marrow suppression

What of the following is not a standard supportive care measure during administration of high-dose methotrexate?

A. Treat third-space fluid collections prior to administration

B. Provide adequate hydration and maintain urine alkalinization

C. Administer mesna 4 hours after methotrexate is given

D. Provide leucovorin rescue within 24 hours of the start of methotrexate infusion

Q1 Answer: C Q2 Answer: C

Expansion of Medication Tray Check Technology Across Multiple Sites within a Health System

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Background/Purpose
Pharmacists and pharmacy technicians are responsible for the maintenance of 600+ medication trays and kits utilized in emergency situations (e.g., Code Blue), critical care transport, and surgeries at UW Health (UWH). Currently, pharmacists and technicians check each tray item to ensure correct quantity, location, and date upon daily tray replenishment and during a twice-yearly tray exchange, innately leading to waste and potential medication errors.

The purpose of this project is to expand tray checking technology (TrCT) to the UWH Central Pharmacy (CP) and Pharmacy Distribution Services Building (PDSB) to streamline the process while ensuring medication accuracy. Project objectives include (1) assessing current state tray processing systems, (2) developing a plan to expand TrCT to CP and PDSB, (3) execute a go-live technology and process implementation, and (4) evaluate TrCT expansion and establish plans for longitudinal adjustments.

Methods
Objective 1 methods: (1) Shadow and perform time trials on current processes, (2) assess technology needs, (3) meet with internal supplies management and information services teams, and manufacturer

Objective 2 methods: (1) Create a project team, (2) create go-live and post-implementation workflows, (3) develop inventory needs assessment, (4) establish and redesign respective tray-checking and medication storage spaces

Objective 3 methods: (1) Purchase TrCT technology and medications, (2) educate and train frontline staff, (3) label medications prior to tracking go-live, (5) construct TrCT inventory and scanning areas, (6) implement scanning and tracking go-live of ACLS and BLS medication trays

Objective 4 methods: (1) Measure post-implementation parameters, obtain and incorporate feedback from frontline staff, (3) assess expanding to other tray types

Hypothesis
Expanding the utilization of TrCT at UWH will ensure 100% accuracy of all trays and reduce pharmacist and technician time involved in the process. Pre- and post-metrics will be collected to compare workflow efficiency and medication errors before and after TrCT implementation.
Learning Objectives:
Identify the benefits of medication tray checking technology
Describe key features of ensuring process sustainability post-implementation
Self Assessment Questions:
What is a benefit of medication tray checking technology?
A. Decreased pharmacist time
B. Increased technician time
C. Increased medication safety
D. A & C
Which step of the implementation process is key to ensuring long-term sustainability?
A. Create and share workflow diagrams to illustrate process changes
B. Consult frontline staff to make shared decisions on process owners
C. Define position-specific roles for ongoing tray management
D. All of the above
Q1 Answer: D Q2 Answer: D

Retrospective Analysis of Metabolic Effects Amongst Veterans Prescribed Pharmacotherapy for Weight Loss in Addition to Comprehensive Lifestyle Intervention

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The current study will examine the metabolic effects among veterans who are prescribed pharmacotherapy for weight loss in addition to comprehensive lifestyle inventions, such as the â€œMOVEâ€ program. The goal of this study will be to determine the potential metabolic benefits, as well as, reduction in medication burden for patients receiving pharmacotherapy for weight loss.

Obesity increases prevalence and risks associated with hypertension, dyslipidemia, type 2 diabetes mellitus (diabetes), coronary heart disease (CHD), stroke, gallbladder disease, osteoarthritis, sleep apnea/respiratory problems, and some cancers. A 5% reduction in mean weight loss can be correlated with an improvement in metabolic functioning throughout the body. Aside from increased morbidity and mortality, significant healthcare resources and expenditures are devoted to treatment of comorbidities associated with excess body weight

A retrospective chart review will be conducted on patients at the HWW VAMC with a prescription of Orlistat, Phenteramine/Topiramate (Qsymia), Buproprion/Naltrexone (Contrave), Liraglutide (Saxenda), and Semaglutide (Wegovy) between January 1, 2010 and August 31,2022. Data will be obtained through the VHA Corporate Data Warehouse (CDW) and stored on the VA Informatics and Computing Infrastructure (VINCI) research server. The primary outcome is to analyze change in weight, A1c, blood pressure, and lipid panel from prior to initiation of weight loss pharmacotherapy. Secondary outcomes include reduction in anti-diabetic and anti-hypertensive medications, as well as, tolerability of weight loss regimen.
The primary risk for this retrospective study would be compromised patient data.
The potential benefits for patients include improved metabolic outcomes facilitated by weight loss pharmacotherapy and comprehensive lifestyle intervention, as well as, increased provider utilization of pharmacotherapy for weight loss. Another potential benefit would be expansion of clinical pharmacy services to facilitate titration/co-management of these medications.

Learning Objectives:
Identify the potential metabolic benefits in patients receiving pharmacotherapy for weight loss.
Identify reduction in medication burden in patients receiving pharmacotherapy for weight loss.
Self Assessment Questions:
A ____% reduction in mean weight loss can be correlated with an improvement in metabolic functioning throughout the body
A. 5
B. 2
C. 1
D. 3
Obesity increases prevalence and risks associated with:
A. Hypertension, Type 2 Diabetes Mellitus, Stroke, Sleep Apnea/Respiratory Problems
B. Dyslipidemia, Coronary Heart Disease,
C. Gallbladder Disease, Osteoarthritis
D. All of the above
Q1 Answer: A Q2 Answer: D

Analysis of Blood Pressure Management in Patients Presenting with Hemorrhagic Stroke to a Gundersen Lutheran Health System Hospital

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approximately 13% of the stroke population, but result in a much higher mortality rate. Quality standards for Joint Commission-certified Primary Stroke Centers include initiation of blood pressure management within 15 minutes for patients presenting with hypertension and hemorrhagic stroke and treatment to systolic blood pressure (SBP) less than 160 mmHg. The aim of this study is to evaluate the current state of blood pressure management in patients presenting with hemorrhagic stroke at Gundersen Lutheran Medical Center (GLMC).

Methods: This study was approved by the GMLC Institutional Review Board. The study is a single center, retrospective review of blood pressure management in adult patients who presented to a GMLC hospital with a hemorrhagic stroke from January 1, 2019 to October 31, 2022. Primary outcome measures include time to first blood pressure medication initiation and time to blood pressure control. Additional information collected includes use of designated order set, identify of clinician initiating orders, and time for each process step prior to antihypertensive medication administration.

Results/Conclusion: Data analysis is ongoing. Findings will be presented at the 2023 Great Lakes Pharmacy Resident Conference.

Learning Objectives:
Discuss the current recommendations for blood pressure management in patients with hemorrhagic stroke
Describe the consequences of hypertension in the setting of hemorrhagic stroke
Self Assessment Questions:

To align with Joint Commission quality standards, in patients with hemorrhagic stroke the goal SBP is < ___. In patients with hypertension, blood pressure agents should be initiated within ___ minutes of identification of hemorrhagic stroke.

A. 160 mmHg, 15 minutes
B. 160 mmHg, 30 minutes
C. 185 mmHg, 15 minutes
D. 185 mmHg, 30 minutes

In patients with acute hemorrhagic stroke, high blood pressure increases the risk of which of the following?

A. Hematoma expansion
B. Growth of the perihematomal edema
C. Early rebleeding into the brain
D. All of the above

Q1 Answer: A Q2 Answer: D

Evaluation of Loop Diuretic Dose for Treatment of Acute Decompensated Heart Failure as Compared to Prior to Admission Dose

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dosing recommendations for IV diuretics compared to prior to admission (PTA) oral doses are not concrete. Position statements and treatment algorithms allude to dosing recommendations from the DOSE Trial, but there is likely considerable variability in initial dosing of IV diuretics for patients admitted with ADHF. This study will aim to evaluate institution-specific strategies for dosing, as compared to PTA doses, and the subsequent effect on efficacy.

This study is a retrospective, case-control study, evaluating the initial IV diuretic doses administered within the first 24 hours of admission to the hospital and compared to patientsâ€™ PTA doses. Two groups will be analyzed: a â€œlow-doseâ€group (initial IV dose < 200% of PTA dose), and a â€œhigh-doseâ€group (initial IV dose >200% of PTA dose). IV doses will be compared to PTA dose on a milligram-to-milligram basis. As a surrogate marker for adequate decongestion, the primary outcome will assess the difference in time (in hours) until the patient was transitioned to oral diuretics. Overall length of hospital stay, differences in 30-day mortality, and percent change in discharge dose of loop diuretics as compared to PTA dose will also be evaluated. As a secondary analysis, this study will re-assign groups based on the same target percentages mentioned above, with adjustments for bioavailability. Patients will be included if they have a primary admitting diagnosis of ADHF, had a completed medication history by a pharmacist, required non-intensive care unit level of care, were on a stable dose of a loop diuretic for at least one month PTA (>40mg furosemide equivalent), and have a documented echocardiogram within six months PTA.

Results and conclusion will be reported at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss the evidence surrounding current recommendations for initial inpatient loop diuretic dosing and recognize the variability in initial dosing strategies.

Identify the importance of optimal loop diuretic dosing upon admission to the hospital for acute decompensated heart failure

Self Assessment Questions:

The most recent 2022 AHA/ACC/HFSA Guidelines for the Management of Heart Failure provide guidance for initial loop diuretic use for hospitalized patients with ADHF. Which of the following is a guideline recommendation that defines the strategies and goals of care when using loop diuretics for ADHF?

A. Patients with evidence of fluid overload should be promptly treated with IV loop diuretics to improve mortality
B. Patients with evidence of fluid overload should be promptly treated with IV loop diuretics to improve symptoms and reduce morbidity
C. Patients with evidence of fluid overload should be promptly treated with oral loop diuretics to improve mortality
D. Patients with evidence of fluid overload should be promptly treated with oral loop diuretics to improve symptoms and reduce morbidity

Which of the following findings from the DOSE Trial support guidance for optimal loop diuretic dosing with a high-dose strategy (2.5 times a patientâ€™s home dose) upon admission for ADHF?

A. There was a statistically significant difference for worsening of serum creatinine levels at 72 hours for patients in the high-dose group
B. Patients in the high-dose group were more likely to require an increase in dose of diuretics at 48 hours
C. Patients in the high-dose group were more likely to change to oral diuretics at 48 hours
D. Lower doses of furosemide resulted in greater relief of congestion identified by fluid loss, weight loss, and dyspnea relief

Q1 Answer: B Q2 Answer: C

Development and Implementation of a Specialty Pharmacy Clinical Dashboard for Sickle Cell Disease Medication Management

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Purpose: The University of Illinois Hospital and Health Sciences System Specialty Pharmacy Services (UI Health SPS) provides care to patients with complex or chronic diseases, including those diagnosed with sickle cell disease (SCD). SCD patients are more likely to experience health care disparities, poor health outcomes, and a reduced life expectancy as compared to patients without SCD. Clinical dashboards can leverage data visualization techniques to guide practice decisions by allowing users to quickly process pertinent information. The purpose of this project is to develop and implement a SCD-specific clinical dashboard for pharmacists and to evaluate dashboard use in a in health-system based specialty pharmacy via usability measures (i.e. effectiveness, user satisfaction).

Methods: The clinical data for the dashboard will be drawn from metrics encompassing the patient population filling specialty medications for iron overload or sickle cell anemia with UI Health SPS. Dashboard metrics include medication adherence, adverse event management, and monitoring. Data will originate from the UI Health SPS patient management system and the pharmacy dispensing system. Dashboard utilization will be evaluated through surveys, user feedback, and/or other various task-based measures like intervention counts. The sickle cell disease (SCD) dashboard, created in Microsoft Excel, was implemented on January 18, 2023, and the dashboard identified patients who may benefit from pharmacy interventions.

Results: To date, the dashboard includes information from 19 SCD UI Health SPS patients. Baseline population data has been analyzed. The average proportion of days covered (PDC) at the date of dashboard implementation was 89.2%. At that time, 5 patients were identified as â€œat-riskâ€ due to having a PDC < 80%. Data is currently being collected, and results will be presented at the conference.

Learning Objectives:

Identify sickle cell disease clinical outcomes and specialty medication treatments

Recognize components/factors of a clinical dashboard that effect pharmacist usability and implementation

Self Assessment Questions:

What is one of the most common side effects of iron chelation therapy?

A. Constipation

B. Diarrhea

C. Headaches

D. Hypertension

Which of the following is a potential drawback of clinical dashboards?

A. Improve speed and accuracy and clinical decisions

B. Reduce burden of analyzing data

C. Increase processing time for a user to formulate the first insight

D. Identify trends in large data sets

Q1 Answer: B Q2 Answer: C

Chemoradiation with Carboplatin and Paclitaxel in Older Adults with Head and Neck Cancer

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Purpose: The preferred treatment for locally advanced head and neck squamous cell carcinoma (HNSCC) in fit patients is concurrent chemoradiation with high-dose cisplatin. Many older adults are not eligible for cisplatin due to comorbidities, performance status, or risk of severe toxicities. Therefore, the optimal treatment of HNSCC in older patients remains unclear, and alternative chemo-sensitization regimens are frequently utilized. Older adults have been underrepresented in clinical trials of alternative chemoradiation for HNSCC, leading to minimal prospective data to guide therapeutic decision-making. This study will evaluate the efficacy and safety of concurrent chemoradiation with carboplatin/paclitaxel compared to radiation alone in adults >65 years old at Michigan Medicine.

Methods: This retrospective, single-center, cohort study will include patients aged >65 years with locally advanced, previously untreated HNSCC who received definitive chemoradiation with carboplatin/paclitaxel or radiation alone. Patients with salivary gland tumors, nasopharyngeal HNSCC, cutaneous HNSCC, documented distant metastases, adjuvant treatment intent, or inadequate follow-up will be excluded. Patient data will be retrieved from the Michigan Radiation Oncology Analytics Resources (M-ROAR) database and manual chart review. Data will be collected securely using REDCap and will include patient demographics and comorbidities, treatment characteristics, toxicities, and disease outcomes. The primary endpoint will be median disease-free survival. Secondary endpoints will include overall survival, three-month treatment response, unplanned treatment breaks, unplanned hospitalizations, feeding tube dependence, and treatment-related toxicities. Data analysis will be performed with descriptive statistics for baseline demographics, Fisher Exact Test or Chi Square Test for categorical variables, and Student-t Test or Mann Whitney U Test for continuous data. Pending final population size, propensity score matching or univariable/multivariable cox proportional hazards analyses will be used to account for selection bias at baseline in the study population.

Final results and conclusions are forthcoming and will be presented at the Great Lakes Residency Conference.

Learning Objectives:

Discuss The potential risks and benefits of treatment options currently available to older adult patients with HNSCC.

Describe The relationship between study outcomes and previously published data on concurrent chemoradiation for older adults with HNSCC.

Self Assessment Questions:

Which of the following is a common exclusion criterion for treatment with cisplatin due to its toxicity profile?

A. Ulcerative colitis
B. Grade 2 hearing loss
C. Atopic dermatitis
D. Child-Pugh B hepatic impairment

Which of the following agents is included in the NCCN guidelines as an option for concurrent chemoradiation in patients who cannot receive high-dose cisplatin for locally advanced HNSCC?

A. Infliximab
B. Cytarabine
C. Dacarbazine
D. Cetuximab

Q1 Answer: B Q2 Answer: D

HIV PrEP: Missed Need at an Urban, Academic, Medical Center?

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Individuals who qualify are those who participated in anal or vaginal sex in the past 6 months and have an HIV-positive sexual partner, bacterial sexually transmitted infection (STI) in the past 6 months, or history of inconsistent or no condom use with sexual partner. Although national estimates exist, there is limited data on the uptake for PrEP at individual medical centers based on positive STI test results. Results of this study have the potential to guide other clinics in their efforts to provide optimum PrEP care. The primary objective of this study is to compare patients that qualified for HIV PrEP based on a positive STI result in the past 12 months and that were offered or received PrEP to patients that qualified for PrEP based on a positive STI result in the past 12 months that did were not offered or did not receive PrEP. A retrospective cohort study will be conducted on patients who had a positive STI result at UI Health between 1/1/2021 and 1/1/2022. The primary endpoints evaluate if patients who qualified were offered and/or received PrEP. The secondary endpoints include the agent selected for HIV PrEP, adherence to follow-up visits, and the length of time spent on therapy. The following data will be collected: patient age, gender, race, sexual orientation, history of mental health diagnosis, insurance coverage, zip code, date and result of positive sexually transmitted infection, and clinic at first diagnosis. Provider documentation in the electronic medical record will be reviewed to determine if patient was counseled, offered, or prescribed HIV PrEP. All data will be recorded without patient identifiers and maintained confidentially.

Learning Objectives:

Identify Patients that qualify for PrEP based on updated CDC guidelines
Recall Efficacy of HIV PreP when prescribed and taken correctly

Self Assessment Questions:

Which of the following patients does not qualify for HIV PrEP?

A. Patient that tested positive for Chlamydia in the last 3 months
B. Patient who has a history of inconsistent/no condom use
C. Patient who comes to clinic with a positive HIV result
D. Patient who has tested positive for syphilis in the last 6 months

How effective is HIV PreP when taken appropriately?

A. 1
B. 0.99
C. 0.9
D. 0.7

Q1 Answer: C Q2 Answer: B

Clinical comparison of adjusted body weight-based versus actual body weight-based daptomycin dosing for obese patients with MRSA bacteremia

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Daptomycin was historically dosed utilizing total body weight (TBW) regardless of body mass index (BMI). However, pharmacokinetic/pharmacodynamic studies have indicated dosing daptomycin on TBW in obese populations may lead to increased drug exposure and toxicity. The purpose of this study is to comparatively evaluate efficacy and safety of daptomycin for methicillin-resistant Staphylococcus aureus (MRSA) bacteremia in obese patients (BMI â‰¥30 kg/m2) with dosing based on adjusted body weight (AdjBW) versus TBW.

This will be a multicenter, retrospective, cohort study evaluating patients treated with daptomycin between January 1st, 2014 to July 31st, 2022. Patients will be included if they are 18-89 years old with MRSA bacteremia and received at least 7 days of daptomycin therapy. Patients will be excluded if there was unclear documentation of intended milligram per kilogram dose, an alternative dosing strategy was used for 48 hours or longer (e.g., TBW switched to AdjBW after 72 hours), an isolate with daptomycin non-susceptibility was identified, adjunctive MRSA therapies were provided for 10 days or longer, incarcerated patient status, or daptomycin was initiated at an outside hospital prior to transfer. Multivariable logistic regression will be used to examine the association between AdjBW-based dosing and clinical failure, while adjusting for proven confounders. Clinical failure represents a composite outcome of 60-day bacteremia recurrence and/or 60-day all-cause mortality. Secondary outcomes include significant creatinine kinase elevations, infection-related length of stay, 14-day mortality, and time to culture clearance.

Data collection for this study is currently ongoing. Results will be presented at the conference.

The data for this study will be used to determine the appropriateness of daptomycin dosing based on AdjBW in obese patients with MRSA bacteremia.

Learning Objectives:
Review the current evidence surrounding weight-based dosing strategies for daptomycin
Discuss the potential benefits of utilizing adjusted body weight-based dosing with daptomycin in obese patients
Self Assessment Questions:
Which of the following summarizes the published literature evaluating the use of daptomycin in obese populations?
A. Several randomized controlled trials have investigated adjusted body weight-based dosing in obesity
B. Studies evaluating dosing strategies in obesity are limited by heterogenicity within implicated organism(s) and infection type
C. Studies support adjusted body weight-based dosing in obesity for infections secondary to vancomycin-resistant Enterococcus species only
D. No evidence currently exists surrounding the use of adjusted body weight-based dosing in obesity
Which of the following is a possible benefit associated with adjusted body weight-based dosing in obese patients requiring prolonged courses of daptomycin therapy?
A. Improved rates of clinical resolution
B. Decreased risk for creatine kinase elevations
C. Less frequent dosing
D. Decreased length of hospital stay
Q1 Answer: B Q2 Answer: B

Retrospective Study on the Continuation of Buprenorphine in the Perioperative Setting
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Purpose: The purpose of this study is to provide support for 2020 Substance Abuse and Mental Health Services Administration guideline for opioid use disorder recommending continuation of buprenorphine perioperatively by evaluating the total morphine milligram equivalent (MME) requirements in the first 24 hours postoperatively of patients who continued their buprenorphine therapy to those who discontinued their buprenorphine therapy preoperatively.
Methods: This IRB approved retrospective chart review was conducted on surgical buprenorphine candidates and consists of approximately 75 patients hospitalized at participating institution sites from 01/01/2015 through 08/31/2022. Patients included in the study are adults with preexisting buprenorphine use who underwent inpatient surgery while hospitalized. Patients who were pregnant, incarcerated, discharged less than 24 hours postoperatively, underwent a second surgery less than 48 hours postoperatively, or experienced death less than 24 hours postoperatively will be excluded from the study. The primary objective compares the total MME required in the first 24 hours postoperatively in those who continued their buprenorphine throughout the perioperative time to those who discontinued buprenorphine preoperatively. Secondary efficacy outcomes include evaluating the following at 24, 48, and 72 hours postoperatively: total MME administered, average daily pain scores, and use of non-opioid analgesics. Additional secondary outcomes will include whether or not buprenorphine home regimens changed at discharge and the rate of respiratory depression within 72 hours postoperatively, defined as a respiratory rate < 10/minute, oxygen saturation < 90%, or requirement of naloxone.
Results: Preliminary results demonstrate decreased average pain scores and total MMEs administered at 24 hours in patients whose buprenorphine was continued perioperatively when compared to those whose buprenorphine was discontinued. Continuation of buprenorphine perioperatively shows no increased rate of respiratory depression.
Conclusion: Continuation of buprenorphine perioperatively is both safe and effective at reducing the total MME provided to patients in the first 24 hours postoperatively.
Learning Objectives:

Describe buprenorphine's activity at opioid receptors.
Explain the mechanism by which buprenorphine can be used for pain management at therapeutic doses without increased adverse effects (respiratory depression, sedation, etc.).

Self Assessment Questions:

Buprenorphine displays which of the following activities at opioid receptors:

A. Full agonism at the mu-opioid receptor
B. Partial antagonism at kappa- and delta-opioid receptors
C. Partial agonism at the mu-opioid receptor
D. Both B. and C.

Which of the following effects is an exception to the ceiling effect on buprenorphine's various opioid effects?

A. sedation
B. analgesia
C. euphoria
D. pupillary constriction

Q1 Answer: D Q2 Answer: B

Efficacy of Potassium Binders in the Management of Acute Hyperkalemia in the Emergency Department: a Retrospective, Cohort Study

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Purpose: Potassium binders are approved for the management of chronic hyperkalemia. However, there has been rising use of potassium binders for acute hyperkalemia despite limited studies demonstrating efficacy. The purpose of this study within the emergency department (ED) is to determine whether the addition of a potassium binder to standard of care will decrease serum potassium levels more than the standard of care alone.
Methods: This single-center, retrospective, cohort study will examine patients treated for acute hyperkalemia in the ED between December 1, 2021 and November 30, 2022. Patients who meet the following criteria will be included: a serum potassium level of at least 5.8 mmol/L and receipt of standard of care for acute hyperkalemia with or without a potassium binder. Standard of care will include intravenous (IV) insulin at minimum. Potassium binders will include sodium zirconium cyclosilicate (SZC) 5 or 10 grams or sodium polystyrene sulfonate (SPS) 15 or 30 grams. Patients with concomitant diabetic ketoacidosis, chronic potassium binder use, or who are pregnant, breastfeeding, or a prisoner will be excluded. The primary outcome will be the change in serum potassium from baseline to initial repeat serum potassium. Initial repeat serum potassium level will be defined as the first serum potassium collected between 4 to 12 hours post administration of insulin. Secondary outcomes will include change in serum potassium at 12 to 24 hours and 24 to 36 hours, hospital length of stay, in-hospital mortality, and incidence of adverse events.
Results and Conclusion: Final results and conclusions will be presented at the 2023 Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Review recommended standard of care treatment regimens for acute hyperkalemia per the 2018 KDIGO conference on acute hyperkalemia
Discuss recent studies examining the use of potassium binders for acute hyperkalemia

Self Assessment Questions:

Which of the following regimens would be considered standard of care for acute hyperkalemia with EKG changes according to the 2018 KDIGO conference recommendations?

A. Potassium binder + loop diuretic
B. Normal saline + subcutaneous insulin
C. Intravenous insulin + potassium binder
D. Intravenous insulin + dextrose + calcium gluconate

Which of the following statements is true regarding the ENERGIZE trial?

A. The study met power and showed a statistically significant difference in serum potassium at 4 hours with SZC compared to standard of care
B. The study did not find a statistically significant difference in serum potassium at 4 hours with SZC compared to standard of care
C. The study found a statistically significant difference in serum potassium at 4 hours with SPS compared to standard of care
D. The study looked at chronic kidney disease patients and did not find a statistically significant difference in serum potassium at 4 hours with SPS when compared to standard of care

Q1 Answer: D Q2 Answer: B

Evaluation of all-cause mortality and cardiovascular outcomes with low versus high dialyzable beta blockers in patients on chronic hemodialysis

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Hypertension, coronary artery disease, and heart failure are common comorbidities associated with chronic kidney disease. Beta blockers have been used as a treatment option for many cardiac disease states due to the clinical need to decrease sympathetic activity. Patients receiving hemodialysis are often excluded from randomized controlled studies; however, retrospective and prospective data exist showing an association between beta blockers and decreased all-cause mortality, cardiovascular mortality, and hospitalizations in patients receiving dialysis. Among beta blockers there are important differences in pharmacological characteristics such as cardioselectivity and dialyzability. Conflicting data exist on the association of beta blocker dialyzability and outcomes including mortality and cardiovascular events in patients receiving hemodialysis.

This is a retrospective, single center, cohort study conducted at a quaternary referral academic medical center. Patients on chronic hemodialysis and receiving a low or high dialyzable beta blocker for at least 3 months between January 1, 2017 and December 31, 2019 were included in the study. Pregnant patients and patients on peritoneal dialysis were excluded. Patients were grouped into one of two cohorts, (1) those receiving a low dialyzable beta blocker or (2) those receiving a high dialyzable beta blocker.

The aims of this study are to (1) evaluate differences in all-cause mortality between patients on hemodialysis receiving low vs. high dialyzable beta blockers, (2) identify independent risk factors for mortality using a multivariate logistic regression, and (3) evaluate differences in major adverse cardiovascular events in patients on hemodialysis receiving a low vs. high dialyzable beta blocker.

Data collection and analysis are on-going.

Conclusions will be presented at Great Lakes Pharmacy Residents Conference in April 2023.

Learning Objectives:

Explain the differences in pharmacological characteristics among beta blockers and the potential impact on mortality and cardiovascular outcomes in patients on hemodialysis.

Recognize the clinical impact the choice of beta-blocker in patient care will have on mortality and cardiovascular outcomes in patients receiving hemodialysis.

Self Assessment Questions:

Which of the following outcomes have been associated with beta blocker use in patients on hemodialysis?

A. Increased cardiovascular mortality
B. Increased all-cause mortality
C. Decreased cardiovascular mortality
D. Decreased incidence of atrial arrhythmias

Which of the following is the primary aim of this research study in patients on chronic hemodialysis receiving either a low or high dialyzable beta

A. To evaluate differences in all-cause mortality
B. To evaluate differences in cardiac mortality
C. To identify independent risk factors for cardiovascular events using a multivariate logistic regression
D. To evaluate differences in adverse reactions

Q1 Answer: C Q2 Answer: A

VANCOMYCIN VS METRONIDAZOLE FOR FIRST RECURRENCE OF CLOSTRIDIOIDES DIFFICILE INFECTION IN PEDIATRIC PATIENTS

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Background: The most recent Infectious Disease Society of America IDSA guidelines recommend fidaxomicin and oral vancomycin adults for first recurrence of Clostridioides Difficile infection (CDI) over metronidazole. Metronidazole, which was once considered first line for adult patients, is now reserved for adjunctive IV therapy in fulminant disease or for situations in which vancomycin and fidaxomicin are unavailable. Historically, metronidazole was preferred over oral vancomycin due to cost and concern for vancomycin-resistant Enterococcus (VRE). Despite this concern, in 2019, a large retrospective study of patients treated for CDI demonstrated no increased risk in developing VRE when treated with vancomycin vs metronidazole. Like many pediatric disease states, some of the data for CDI is extrapolated from adult studies. The current pediatric recommendations reflect previous adult CDI guidelines, endorsing either oral vancomycin or metronidazole as first line treatment options for nonsevere disease. This study aims to fill a gap in current data and to optimize antimicrobial therapy in pediatric patients with first recurrence of CDI by comparing the rates of improvement in diarrhea at day 10 in patients treated with vancomycin vs patients treated with metronidazole.â€¯

Methods: This was a retrospective cohort study of pediatric patients within the IU Health system who were treated for first recurrence of CDI with either metronidazole or vancomycin between March 2011-March 2022. Electronic chart review will be performed for patients 2 to 18 years of age. The data analyzed was pulled from the IU Health Infection Prevention Database. The primary outcome is improvement in diarrhea at day 10. The secondary outcomes are length of stay, recurrence of CDI within 90 days and serious adverse effects defined as any adverse effect that results in a change of therapy.

Results: Data collection is currently in progress. Results and conclusions will be presented at the 2023 Great Lakes Resident Conference.

Learning Objectives:
Describe the current gaps in literature surrounding the treatment of first recurrence of Clostridioides Difficile Infection in pediatric patients
Identify common adverse drug reactions associated with oral metronidazole
Self Assessment Questions:
Which medication was previously preferred for treatment of CDI due to concern for drug resistance?
A. Metronidazole
B. Vancomycin
C. Fidaxomicin
D. Rifaximin
What is a common potential adverse effect of oral metronidazole?
A. QT prolongation
B. Nausea
C. Hyperhidrosis
D. Peripheral edema
Q1 Answer: A Q2 Answer: B

Oral Levofloxacin versus Intravenous (IV) Therapy for Streptococcal Bloodstream Infectionsâ€¯
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Streptococcus spp has been identified as a common cause of bloodstream infections (BSIs) leading to significant mortality. Gram-positive BSIs have been traditionally treated with IV antibiotics instead of oral antibiotics due to the concern for poor absorption and subtherapeutic plasma concentrations. IV therapy, however, can prolong hospitalization and be logistically challenging in the outpatient setting while also increasing risks for line-associated adverse events (AEs). There is increasing interest in the use of oral levofloxacin given its high bioavailability and ease of administration for the treatment of Streptococcal BSIs.â€¯The purpose of this study is to compare clinical outcomes in patients receiving definitive treatment with oral levofloxacin versus intravenous therapy for the treatment of Streptococcal BSIs.
This is a retrospective, single-center, noninferiority study evaluating the clinical outcomes of patients hospitalized with uncomplicated Streptococcal BSIs at The Ohio State University Wexner Medical Center (11/01/2011-8/31/22). Patients were included if they were 18 to 89 years old with Streptococcus spp. in one or more blood cultures. Patients were excluded if they were prisoners, died within 48 hours of index culture, developed polymicrobial BSIs or deeper Streptococcal infections, or grew a Streptococcal isolate resistant to levofloxacin.â€¯â€¯Eligible patients were divided into two treatment groups based on the definitive antibiotic treatment received: 1) Only IV antibiotic therapy or 2) Only oral levofloxacin therapy or IV therapy that was switched to oral levofloxacin therapy within 96 hours. The primary outcome is clinical failure defined as a composite of 30-day BSI recurrence, 30-day infection-related readmission, and 30-day all-cause mortality. Based on preliminary results, 135 patients will be included in the final data analysis which will have 57% power to detect a non-inferiority margin of 5% for oral levofloxacin relative to IV therapy.
Data collection is ongoing. Preliminary results and conclusion will be presented at the Great Lakes Resident Conference.

Learning Objectives:
Explain the risks of using IV antibiotic therapy versus de-escalating to oral levofloxacin for uncomplicated Streptococcal BSIs.
Describe the current literature for the use of oral levofloxacin for the treatment of Streptococcal BSIs.
Self Assessment Questions:
Which of the following is/are limitation(s) of using IV antibiotic therapy versus de-escalating to oral levofloxacin for uncomplicated Streptococcal
A. IV antibiotic therapy can prolong hospitalization
B. IV antibiotic therapy can lead to more line-associated adverse effects (Ex. Infection, phlebitis, thrombus formation)
C. IV antibiotic therapy can be more logistically challenging in the outpatient setting
D. All of the above
Which BEST describes the general consensus from previous studies on the use of oral levofloxacin for Streptococcal BSIs?
A. There is no data published data that compares step-down oral levofloxacin vs IV therapy for Streptococcal BSIs
B. Step down oral antibiotic therapy is associated with a significantly shorter LOS compared with continued IV therapy
C. Only complicated Streptococcal BSIs (Ex. Infective endocarditis, CNS infections) have been adequately studied
D. Step down oral antibiotic therapy significantly reduced infection-related readmissions and Streptococcal reinfections compared to IV antibiotic therapy
Q1 Answer: D Q2 Answer: B

Knowledge and Perceptions of Healthcare Providers with Additional Credentialing in HIV Regarding Vaccine Coadministration
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Background: The World Health Organization estimates that between 2 to 3 million deaths are prevented worldwide from immunizations each year. However, 1.5 million deaths each year are caused by vaccine preventable diseases. We have vaccines to prevent more than 20 life-threatening diseases, helping people live longer and healthier lives. The Advisory Committee on Immunization Practices (ACIP) consistently recommends that all needed vaccines be administered during a provider visit and that vaccination not be deferred because multiple vaccines are needed. It is considered a best practice to administer all eligible vaccines at the same visit as it increases the probability that a person will be up to date on recommended vaccines and decreases the time they are susceptible to vaccine preventable diseases. Vaccine coadministration is especially important if a healthcare provider is uncertain a patient will return for follow up care or for additional doses of vaccines. This study will survey healthcare providers with additional credentialing in Human Immunodeficiency Virus (HIV) to determine how many vaccines they are comfortable recommending and administering at a single visit.
Objective: To evaluate the knowledge and perceptions of healthcare providers with additional credentialing in HIV relating to vaccine coadministration and examine responses based on personal and professional demographics.
Methods: This study will be conducted through an anonymous, voluntary, web-based survey that will be distributed via email to credentialed providers of the American Academy of HIV Medicine (AAHIVM). Survey participants may include MDs, DOs, NPs, PAs, and pharmacists. Participants must be at least 18 years old and able to read English. Questions asked during this survey will be related to: personal and professional demographics, vaccine administration practices in the participantsâ€™ workplace, and provider/patient perceptions related to vaccine coadministration. IRB approval is pending through Howard Brown Health.
Results: Pending data collection.
Conclusion: Pending data collection and results.
Learning Objectives:
Discuss factors that are known to influence vaccination rates.
Review the Advisory Committee on Immunization Practices (ACIP) recommendations relating to vaccine coadministration.
Self Assessment Questions:
Which of the following has consistently been the strongest predictor of vaccination uptake?
A. Patient's perceived risk of disease
B. Convenience/time required for vaccination
C. A provider's recommendation
D. Patient's health conditions
Which of the following is an ACIP recommendation relating to vaccine coadministration?
A. Do not coadminister two live vaccines in one visit
B. All vaccines a patient is eligible for should be administered at the same visit
C. Patients who are immunocompromised should not receive multiple vaccines on the same visit
D. A maximum of 3 vaccines should be administered in one visit
Q1 Answer: C Q2 Answer: B

Clinical Pharmacist Workload Metrics Tracking - Blind Pharmacy
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Clinical pharmacy leadership at University of Wisconsin (UW) Health lacks the means to objectively measure acute care pharmacist work. At UW Health, inpatient pharmacist workload primarily, but not completely, consists of admission and discharge medication reconciliation, order verification, and clinical monitoring. Currently, there is no system in place to quantify acute care clinical pharmacist workload. This prevents retrospective data-driven evaluation of resource allocation, namely for pharmacist full-time equivalent (FTE). The leadership team seeks a method to evaluate the distribution of pharmacist FTE more appropriately.

The project aim is to implement a tracking system for acute care clinical pharmacist workload metrics to assess resource allocation.

Methods:

Primary objectives of this project include developing a report for tracking clinical pharmacist workload metrics and creating a visual representation of pharmacist workload to assess trends retrospectively using the compiled data. In the period from October 1, 2022, to December 31, 2022, admission, discharge, profile review, and order verification data are compiled from the electronic medical record. Collected data are included for all acute care patients excluding pediatric patients and patients in the emergency department and analyzed to assess time standards for tasks encompassed in pharmacist clinical work. Time standards are applied to clinical tasks to establish baseline clinical pharmacist workload. Clinical pharmacist workload trends are compiled into a dashboard for visual data representations at a specified data point and over time. Secondary objectives of this project include prospectively projecting data trends to estimate future resource needs and expanding the project scope to include pediatrics and emergency medicine.

Outcomes:

Outcomes anticipated spring 2023 following implementation of Metrics Tracking tool. The primary outcome of this project is data collection for assessing clinical pharmacist workload trends and, subsequently, resource allocation at UW Health.

Learning Objectives:

Describe the importance of clinical pharmacist workload metrics tracking at healthcare institutions

Outline the methodology for implementing a clinical pharmacist workload metrics tracking model at oneâ€™s own institution

Self Assessment Questions:

Why is it important for healthcare organizations to be able to track clinical pharmacist workload metrics?

A. To demonstrate the value of clinical pharmacists

B. To assess trends in demand (pharmacist workload volume) over time

C. To evaluate allocation of pharmacist resources

D. All the above

What is an appropriate approach for developing a clinical pharmacist workload metrics tracking model?

A. Adopting a clinical pharmacist workload metrics tracking tool from a peer institution

B. Evaluating time standards for clinical pharmacist tasks

C. Implementing a tally system where all clinical pharmacist tasks are weighted equally

D. None of the above

Q1 Answer: D Q2 Answer: B

Retrospective Evaluation of Paclitaxel Hypersensitivity Reactions at a Multicenter Health System

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Paclitaxel hypersensitivity reactions (HSRs) are fairly common, with an occurrence rate of 2-13%. After reviewing paclitaxel HSR statistics presented at the 2018 Oncology Nursing Society conference, Norton Cancer Institute updated paclitaxel administration rate. No evaluation of paclitaxel HSRs has been conducted within the health system. The primary aim of the study is to assess the impact of a titration protocol on paclitaxel HSRs. The secondary aim is to identify patient risk factors for HSRs

The study is an institutional review board approved retrospective chart review of patients who received paclitaxel from October 2019 to October 2020 at Norton Cancer Institute. Patients were identified based on an electronic medical record report of patients initiated on paclitaxel during the study period. Charts were reviewed to assess the primary and secondary objective. Only the first and second administrations of paclitaxel were evaluated for HSRs. The primary analysis was analyzed using simple logistic regression. Secondary analyses were conducted with simple logistic regression and included the following variables: age, body mass index, ethnicity, disease state, distress score, titration, history of allergy, and pulmonary dysfunction. Significant variables from the univariate analysis were analyzed using a multiple logistic regression model.

A total of 487 patients were screened and 329 met inclusion criteria. The titration protocol was used in 174 patients and 154 did not receive the titration protocol with 27 (15.4%) and 25 (16.2%) experiencing an HSR, respectively. This represented a nonsignificant difference in HSR. Univariate logistic regression revealed gender, concentration, infusion time, and gynecologic malignancy as significant variables for HSR. Multivariate analysis of the significant variables showed only gynecologic malignancies as significant. The titration protocol did not reduce HSRs, and no new risk factors for HSR were identified.

Learning Objectives:
Review interventions utilized to reduce paclitaxel hypersensitivity reactions.
Recognize potential risk factors for increased paclitaxel hypersensitivity reactions.
Self Assessment Questions:
Which premedication regimen is included in the boxed warning for paclitaxel?
A. Acetaminophen, corticosteroids, diphenhydramine
B. Corticosteroids, diphenhydramine, H2 antagonists
C. Corticosteroids, H2 antagonists, Serotonin antagonists
D. Acetaminophen, diphenhydramine, H2 antagonists
Which oncologic disease state has been shown to have highest risk for a paclitaxel hypersensitivity reaction?
A. Lung Cancer
B. Breast Cancer
C. Gastrointestinal Cancers
D. Gynecologic Cancers
Q1 Answer: B Q2 Answer: D

Impact of Education and Category Optimization on I-Vent Standardization

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Intervention documentation demonstrates pharmacist value on direct patient care. At our institution, we utilize the I-Vent documentation tool to communicate between pharmacy personnel and track overall interventions made by staff. Despite documentation remaining an essential task for practicing pharmacists, this continues to be an area for improvement. According to literature, standardization and education has been shown to increase intervention documentation, as well as overall quality. The proposed study is a quality improvement project to standardize and strengthen the documentation process within the pharmacy department at Parkview Health.

Baseline I-Vent documentation was collected for a 6-month timeframe to understand current state, utilization, and streamlining opportunities. A pre-/post-survey method conducted through Microsoft Forms assessed initial areas of confusion regarding I-Vent documentation and impact of education on pharmacist understanding. Both the pre-survey and baseline data were used to optimize the I-Vent categories in coordination with the EPIC Willow team for electronic tool updates. Three live education sessions were then presented to pharmacists over the course of a month, and a reference handout was made available for expectations of I-Vent documentation. This included the standardized process, subtypes, internal content, and follow-up. For those unable to attend a live education session, a recorded session was made available. Implementation of the new quality improvement process went live December 2022. Comparative I-Vent data for a 3-month period post-implementation were analyzed for overall adoption of the new process and categories. Post-surveys were sent at the end of the implementation period. The survey results and I-Vent data were used to assess impact of education and category optimization on I-Vent standardization.

The results and conclusions of this study will be presented at Great Lakes Conference.
Learning Objectives:
Recognize how I-Vent documentation demonstrates pharmacist value
Identify the impact of education and category optimization on I-Vent standardization
Self Assessment Questions:

1.Which of the following methods was used when optimizing I-Vent categories?
A. Encouraged use of the â€œotherâ€ category
B. Added I-Vent category options
C. Consolidated duplicate categories
D. Removed I-Vent subtypes
Which topics were reviewed during the pharmacist education sessions?
A. Updated standardized processes
B. New I-Vent subtypes
C. Adequate follow-up expectations
D. All of the above
Q1 Answer: C Q2 Answer: D

The impact of storing patient specific medications (PSMs) in automated dispensing cabinets (ADCs)

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Purpose:

Patient-specific medications (PSMs) storage varies on patient care units. When medications are unable to be found, nursing staff submits an extra dose request. Currently one of our facilities receives ~100 extra dose med requests/day. This high volume of extra dose requests results in duplicative efforts for nursing and pharmacy impacting medication preparation, delivery, and facilitation of medication administration impacting patient care. The aim is to standardize PSM to improve efficiency of the medication use process.

Methods:

This is a prospective study evaluating the impact storing PSMs in automated dispensing cabinets (ADCs) has on reducing extra dose medication requests. This storage method will be trialed on three units at the IU Health Adult Academic Health Center and data will be collected over a period of 4 weeks. The primary outcome is the number of extra dose medication requests. The secondary outcome will be the number of overdue scheduled medications and average time to deliver patient specific medications by the pharmacy technician pre and post implementation.

Results:

Results will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:
Recognize potential barriers associated with storage of patient specific medications in automated dispensing cabinets.
Explain the steps required to implement patient specific medication storage and the key stakeholders involved.
Self Assessment Questions:
What is a potential barrier of storing patient specific medications in automated dispensing cabinets?
A. Increased overhead cost
B. Medication room physical space
C. Workflow change pushback
D. All of the above
What steps do not need to be taken/evaluated prior to storing patient specific medications in an ADC?
A. Automated dispensing cabinet IS build
B. Medication room space evaluation
C. Change patient specific labels to scan in pyxis
D. Education to pharmacy/nursing of adjustments to the medication use process
Q1 Answer: D Q2 Answer: C

Retrospective Evaluation on the Addition of Vasopressin to Initial Pressor Therapy Dosed by Actual versus Adjusted Body Weight

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Purpose: Patients admitted to the intensive care unit (ICU) with septic shock often require vasopressor initiation to maintain MAP â‰¥65 mmHg. Current literature suggests addition of vasopressin earlier in the course of shock and at lower doses of initial pressor therapy results in faster time to shock resolution and decreases mortality. The approach to calculation of pressor dosing at our institution has recently changed from use of actual to adjusted body weight with the potential benefit of prompter vasopressin initiation. This analysis intends to evaluate any such differential in vasopressin utilization and any associated changes in clinical outcomes.
Methods: A retrospective chart review will be undertaken of adult critical care patients who received an initial pressor agent (norepinephrine, phenylephrine, and/or epinephrine) with the subsequent addition of vasopressin. Patients will be 18 years or older and have a diagnosis of septic shock. The primary outcome will be the degree to which vasopressin is initiated at lower total norepinephrine doses (in mcg/min, or equivalent dose of alternative initial pressor, if utilized) after transitioning from actual to adjusted body weight pressor dosing. Secondary outcomes to be analyzed in the pre and post periods surrounding alteration in dosing weight strategy will include in-hospital mortality, length of ICU stay, time in hours to vasopressin initiation, time to shock resolution (defined as 24 hours off pressor agents), total norepinephrine doses (in mcg/min, or equivalent dose of alternative initial pressor, if utilized) based on body mass index (BMI) class in obese patients (BMI 30 to <35, 35 to <40, or >/=40), and rate of arrhythmias.
Results: In process
Conclusion: In process

Learning Objectives:
Review vasopressor therapy options in the management of septic shock patients
Discuss when vasopressin therapy should optimally be incorporated based on initial pressor commencement timeframe and dosing
Self Assessment Questions:
1. Based on the Surviving Sepsis Campaign, which vasopressor is recommended as 1st line if adequate fluid resuscitation has been achieved?
A. Epinephrine
B. Vasopressin
C. Norepinephrine
D. Phenylephrine
2. In patients with septic shock and inadequate MAP levels despite norepinephrine, what agent should be initiated next in therapy?
A. Vasopressin
B. Phenylephrine
C. Dobutamine
D. Dopamine
Q1 Answer: C Q2 Answer: A

Evaluation of tricyclic antidepressant (TCA) prescribing in the treatment of diabetic peripheral neuropathy (DPN) within Federally Qualified Health Centers (FQHC)
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(TCA) agents continue to be an option for the treatment of diabetic peripheral neuropathy (DPN), even included in the most recent guidelines published by the American Diabetes Association in 2022. However, there exists compelling evidence to acknowledge the risk of prolonged use of anticholinergic agents, including TCAs, on the development of dementia and cognitive decline. There is little information available to describe the patterns of use of TCAs in DPN, particularly within vulnerable adults often cared for in Federally Qualified Health Centers. Therefore, our objective was to better understand prescribing patterns of providers when including TCAs as treatment for DPN with particular attention to concomitant treatments and evaluations of risk and benefit through deprescribing.

Methods: A retrospective chart review of electronic health record data for patients at two different Indiana-based health systems will be performed. A convenience sample of 100 adults â‰¥ 18 years of age will be stratified into two age groups, 18-65 years, and 65+ years. All patients must have a diagnosis of diabetes mellitus, either Type 1(T1DM) or Type 2 (T2DM) and have had current/previous use of tricyclic antidepressants. A deprescribing conceptual framework (Linsky) will be utilized to explore the factors that may affect the potential for future intervention. The components assessed in this framework include patient factors, system factors, the deprescribing process, and effects/measures. Data will be analyzed using descriptive statistics.

Results/Conclusion: Data analysis and collection in progress. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.
Learning Objectives:
Recognize appropriate pharmacologic treatment for diabetic peripheral neuropathy and to assess current medication usage and prescribing of its disease state.
Identify risks and benefits of prescribing and deprescribing of tricyclic antidepressants among patient needing treatment for diabetic peripheral neuropathy.

Self Assessment Questions:

Which of the following medications has an FDA approval for the treatment of diabetic peripheral neuropathy?

A. Oxycodone
B. Duloxetine
C. Ibuprofen
D. Amitriptyline

According to Beers Criteria of High-risk medications, which of the following treatments would be the most inappropriate for the treatment of diabetic peripheral neuropathy among older adults?

A. Amitriptyline
B. Topical Capsaicin
C. Lidocaine Patches
D. Acetaminophen

Q1 Answer: B Q2 Answer: A

Evaluation of Standardizing the Discharge Process for Newly Diagnosed Pediatric Oncology Patients

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Background: Numerous studies have documented the risk of medication errors in the inpatient setting for pediatric patients. However, few studies have evaluated the potential errors that occur during transitions of care among children discharged from the hospital. At this institution there were multiple newly diagnosed patients identified over several months that reported confusion regarding their home medications (taking the wrong dose, wrong duration) at their outpatient follow up appointments. For pediatric leukemia patients adherence to treatment therapy has been shown to reduce the risk of relapse and improve patient outcomes. Opportunities for improving the complex pediatric hematology-oncology discharge process were implemented February 2022 including standardizing utilizing Michigan Medicine discharge pharmacy to fill initial discharge medications and complete bedside medication education for all newly diagnosed pediatric leukemia patients.

Purpose: The purpose of this study is to compare error rates between the historical discharge group to the interdisciplinary discharge group.

Methods: This study was approved by the Michigan Medicine Institutional Review Board. The electronic medical record system identified patients who were newly diagnosed pediatric leukemia patients (<25 years of age) between January 2019 and August 2022. Pediatric patients diagnosed at outside institutions will be excluded. The primary outcome measure is the incidence of oral chemotherapy errors. Secondary outcomes include home medications picked up from the pharmacy prior to discharge medication teach, proportion of discharge instructions provided in preferred language, and the incidence of medication errors for supportive care agents. It was determined that 30 patients in the historical discharge group and 15 patients in the interdisciplinary discharge group would yield 80% power to detect a difference of 0.20% between groups for the primary outcome.

Learning Objectives:

Identify interventions that can improve the transitions of care process for pediatric oncology patients
Describe the impact of discharge standardization has on the number of errors

Self Assessment Questions:

Which of the following were found to improve in the transitions of care process in pediatric oncology patients?

A. Medication education at bedside prior to discharge
B. Follow up visits within 48 hours (or next business day) of discharge
C. A multidisciplinary team approach
D. All of the above

Which of the following describes the impact of the standardization process on oral chemotherapy error rates at Michigan Medicine?

A. Increase in errors
B. Reduction in errors that was statistically significant
C. No impact in the number of errors
D. Reduction in errors that was not statistically significant

Q1 Answer: D Q2 Answer: B

Treatment of Bacteriuria in Patients with Cirrhosis

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Cirrhosis related deaths increased by 31% from 2000 to 2015. Cirrhosis-associated immune dysfunction syndrome (CAID) is a complication that results in immune dysfunction and excessive activation of proinflammatory cytokines. This syndrome predisposes a cirrhotic patient to infections that may trigger septic shock, organ failure, and acute on chronic liver failure (ACLF), resulting in 30-50% mortality. Currently, bacteriuria is often treated in symptomatic and asymptomatic cirrhotic patients due to the provider's concern for bacteremia and increased mortality if left untreated. However, no studies have investigated if treatment of asymptomatic bacteriuria improves outcomes or leads to drug resistance. This study will evaluate the impact of treating or not treating asymptomatic bacteriuria (ASB) in cirrhosis patients.

This was a retrospective cohort study of hospitalized patients with cirrhosis at IU Health who presented with bacteriuria from January 1, 2016, to December 31, 2020. Patients with symptoms of a urinary tract infection (UTI), concomitant infection, and chronic foley catheters were excluded from the study. Patients were grouped by treated for ASB or not treated for ASB. ASB was defined as bacteria growing in the urine and the absence of signs or symptoms. UTI was defined as a positive urinalysis, culture, and symptoms present. Symptoms of UTI were urinary frequency, urgency, dysuria, urinary incontinence, and costovertebral angle tenderness. Altered mental status was not considered a symptom. The primary outcome was the incidence of mortality within 90 days of ASB diagnosis. Secondary outcomes include incidence of bacteremia, extended-spectrum beta-lactamase, carbapenem-resistant Enterobacteriaceae, Clostridioides difficile infection, and bacterial infection due to the same organism from urine culture within 90 days of ASB diagnosis. Baseline characteristics and outcomes were assessed using the Chi-square test for categorical variables and the Student T-test for continuous variables.

Results will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Review the pathophysiology of bacterial infections in cirrhosis patients

Describe Infectious Disease Society of American (IDSA) recommendations on asymptomatic bacteriuria

Self Assessment Questions:

What comorbidity is associated with an increased risk of mortality in patients with bacteriuria?

A. Renal dysfunction
B. Male gender
C. Obesity
D. Age greater than 50 years

Which patient population should be treated for asymptomatic bacteriuria per IDSA guidelines?

A. Pregnancy
B. Cirrhosis
C. Benign prostatic hyperplasia
D. All women

Q1 Answer: A Q2 Answer: A

Flat Dose Gentamicin vs Extended Interval Weight Based Dosing for the Initial Treatment of Suspected Intraamniotic Infections

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Background:
Intraamniotic infections (IAI) are characterized by inflammation of amniotic fluid, placenta, fetus, fetal membranes, or decidua. Timely administration of intrapartum antibiotics when IAI is suspected has been associated with a 10-fold decrease in neonatal sepsis. University Hospitals Cleveland Medical Center adjusted their IAI guidelines by incorporating an initial flat dose of gentamicin (400 mg), replacing the individualized weight-based dose (5 mg/kg), to facilitate rapid administration of antibiotics.

Purpose:
Flat dose gentamicin for IAI has not been previously evaluated. The purpose of this study is to compare the time to administration of flat dose gentamicin to weight-based and assess clinical outcomes.

Methods:
This was a single-center retrospective chart review including 126 women between June, 2021-October, 2021 (pre-implementation group) and June, 2022-October, 2022 (post-implementation group). The primary endpoint was to compare the time to administration between groups. Secondary endpoints included time to verification, time to administration from verification, reasons for delays, and maternal/ neonatal complications. Data was analyzed using descriptive statistics, Chi square/ Fisher's exact tests, and Student's T test's. All statistical tests were two-sided with $p< 0.05$ defined as statistically significant.

Results/Conclusions:
There were 63 patients evaluated in each treatment arm with no significant differences in baseline characteristics between groups. Flat dose gentamicin was associated with a decreased time to administration from time ordered (79.0 minutes (standard deviation (SD) 117.34) vs 162.2 minutes (SD 118.67); p-value < 0.001), time to verification (8.0 minutes (SD 9.72) vs 16.5 minutes (SD 17.45); p-value = 0.001), and time to administration from verification (71.0 minutes (SD 116.83) vs 145.7 (SD 117.53) p-value < 0.001). While this study was not powered for maternal/ neonatal complications, there were no significant differences between groups except for a reduction in post-partum hemorrhages (1.6% vs 14.3%; p-value = 0.008). In conclusion, flat dose gentamicin improved time to administration of antibiotics for IAI.

Learning Objectives:
Discuss the importance of early initiation of treatment IAI
Identify the clinical implications of flat dose gentamicin for IAI

Self Assessment Questions:
1. The American College of Obstetricians and Gynecologistsâ€™ (ACOG) recommend what treatment options as first line for the management of IAI?
A. Ampicillin + gentamicin
B. Piperacillin-tazobactam + vancomycin
C. Ceftriaxone + vancomycin
D. Cefepime + gentamicin

When should treatment for IAI be initiated?
A. After confirmed positive amniotic fluid test
B. At time of delivery of the baby
C. Within 30-60 minutes of suspicion or as soon as possible
D. After delivery of the baby

Q1 Answer: A Q2 Answer: C

Evaluation of the Prescribing Habits of COVID-19 Guideline-Directed Treatments in a Primary Care Walk-In Clinic

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Purpose: The purpose of this study was to evaluate the prescribing habits of internal medicine physicians for mild-to-moderate COVID-19 infections based on the guideline-directed COVID-19 outpatient treatment options available.

Methods: A retrospective chart review from February 2022 to August 2022. Patients were eligible if they were 18 years or older, had a positive home or lab test, and had a telehealth visit within the last seven days of a positive test. Patients were prescribed either nirmatrelvir and ritonavir, remdesivir, molnupiravir, or bebtelovimab for COVID-19 treatment.
The primary endpoint assessed how many patients were potentially inappropriately prescribed one of the available medications for the treatment of COVID-19 in the outpatient setting. The secondary endpoints included presence or absence of a clinical pharmacist consultation at the time of prescribing and hospitalization within 30 days of starting outpatient COVID-19 treatment.

Results: A total of 376 encounters were assessed, of which 226 were included and analyzed. A total of 210 participants received nirmatrelvir and ritonavir. The remaining received molnupiravir or bebtelovimab. Overall, 200 participants who received one of the four preferred medications in the treatment of mild-to-moderate COVID-19 were guideline-concordant. Among patient characteristics, only GFR had a statistically significant difference on the prescribing of medications for the treatment of mild-to-moderate COVID-19. Fifty-six participants received clinical pharmacist consultation. Three participants were hospitalized for COVID-19 within 30 days of receiving an appropriately prescribed medication for treatment.

Conclusions: Nirmatrelvir/ritonavir was the most prescribed medication for the treatment of mild-to- moderate COVID-19, which was appropriate given recommendation as first-line therapy and widespread accessibility. Nirmatrelvir/ritonavir was the only medication with errors when prescribed. The study results will inform additional education such as in-service presentations and handouts and improve prescribing habits moving forward for physicians working in the walk-in clinic.

Learning Objectives:
Identify guideline-directed therapies for mild-to-moderate COVID-19 infections in the outpatient setting
Discuss the utilization of the guideline directed therapies for treatment of mild-to-moderate COVID-19 infections
Self Assessment Questions:
Which of the following medications is the first-line oral treatment of mild-to-moderate COVID-19 infection?
A. remdesivir
B. bebtelovimab
C. nirmatrelvir/ritonavir
D. molnupiravir
Which of the following statements is correct?
A. nirmatrelvir/ritonavir must be initiated within 5 days of symptom onset, renal dose adjusted, and a thorough drug interaction check performed prior to dispensing
B. bebtelovimab is an infusion given over 7 days and able to be used in patients as young as 12 years old
C. molnupiravir is an oral medication that must be initiated within 7 days of symptom onset and should not be used in pregnancy or those at risk of pregnancy
D. remdesivir is an infusion that is administered over three days and must be initiated within 5 days of symptom onset
Q1 Answer: C Q2 Answer: A

The impact of the Medicare Part D Senior Savings Model Program on A1c values in insulin users; a retrospective analysis
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Purpose:
One in three Medicare beneficiaries has type 1 or type 2 diabetes and over 3.3 million of them use insulin. Access to insulin is a critical component of these membersâ€™ medical management. Gaps in this access can increase the risk of serious complications ranging from vision loss to kidney failure, limb amputation and heart attacks. Often, the cost of insulin is the primary barrier to appropriate medical management of diabetes. The Centers for Medicare & Medicaid Services (CMS) created the Part D Senior Savings Model (the â€œModelâ€, which began January 1st, 2021, to provide Medicare beneficiaries with Part D plans that offer affordable prices for insulin. Under the Model, a one-month supply of a broad set of plan-formulary insulins costs no more than $35 each. The purpose of this research project is to capture the impact of lowering the cost barrier of insulin on membersâ€™ diabetes control (A1c).

Methods:
A retrospective analysis was conducted utilizing health plan pharmacy claims of Medicare members who filled a Senior Savings Model Drug from January through November 2022. Electronic medical records (EMR) and medical claims data were then used to pull any A1c values reported for these members from January 2020 to December 2022. Through coordination with the internal actuarial team, the last A1c value reported in 2020 and the last A1c value reported in 2022 for each member was compiled to form the final patient population (n=2148). The change in A1c values from 2020 and 2022 were then evaluated.

Results and Conclusions
Results and Conclusions to be shared at the 2023 Great Lakes Pharmacy Resident Conference

Learning Objectives:
Identify the impact of the Senior Savings Model Program on A1c values in members filling eligible insulin products
Describe the role of insulin cost as a barrier in A1c outcomes in diabetic members
Self Assessment Questions:
About how many Americans skip, delay, or use less insulin than needed?
A. More than 1 million
B. 3.3 million
C. 500000
D. Less than 500,000
About how many Medicare beneficiaries treated with insulin may have reduced out-of-pocket costs with the Senior Savings Model program?
A. 0.25
B. 0.33
C. Less than 25%
D. 0.3
Q1 Answer: A Q2 Answer: B

Pharmacist-driven naloxone distribution in the emergency department through the utilization of an electronic health record risk screening tool

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Statement of purpose:
Opioid overdose deaths continue to rise nationally; one risk mitigation strategy is to increase access to naloxone for patients at high-risk of overdose. Our organization implemented a prescribing-based alert within the electronic health record (EHR) to promote naloxone prescribing, but this did little for patients experiencing an acute overdose who presented to the ED. In January 2022, our organization enrolled in the NARCANÂ® Direct Program, sponsored by the Wisconsin Department of Health Services, which supplies free naloxone to organizations that care for patients at high-risk of opioid overdose. Naloxone distribution in the ED is the new standard of care; to promote this our organization developed a pharmacist-driven screening tool within the EHR to increase efficiency in distributing naloxone to this target population.

Statement of Methods:
This is a pre-/post-evaluation following implementation of the screening tool embedded within the EHR for patients at high-risk of opioid overdose in the ED. The criteria used to identify patients includes current opioid-related ED presentation, history of illicit opioid use or prior opioid overdose, clinical opioid withdrawal scale score documented, active methadone or buprenorphine prescription, high morphine milligram equivalent daily dose prescription, and opioid and benzodiazepine co-prescription. Any one of these characteristics qualifies the patient for free naloxone distribution. The ED pharmacy staff independently screens and distributes naloxone within their workflow. The primary outcome is the frequency of naloxone distribution per 100 ED presentations.

Preliminary Results:
Naloxone kit distribution during the 9-month pre-implementation phase was 1.3 (range 0-4) kits per month, compared to 7.7 (range 3-11) kits per month during the 3-months post-implementation phase (preliminary results).

Conclusions:
Preliminary results indicate that the implementation of a risk screening tool increased the ability of ED pharmacy staff to effectively identify and distribute kits to patients at high-risk for opioid overdose.

Learning Objectives:
Recognize patient characteristics that place them at high risk for opioid overdose.
Identify barriers to increasing the naloxone supply in the community.
Self Assessment Questions:
Which of the following would be considered characteristics of a patient at high risk for opioid overdose?
A. Opioid prescription greater than or equal to 50 MME
B. Co-prescription of a benzodiazepine and opioid
C. Witness of an opioid overdose
D. A and B
Which of the following are barriers to naloxone prescribing?
A. Cost of the prescription
B. Time constraints for the healthcare team
C. Lacking knowledge of indications for prescribing
D. All of the above
Q1 Answer: D Q2 Answer: D

Expansion of a Pharmacist-Managed Transitions of Care Tool for Heart Failure Management at a Veterans Affairs Medical Center
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Purpose: Heart Failure (HF) is currently the leading cause of hospitalization within the United States and carries a readmission rate of 24% within 30 days of discharge. A previous study at this site demonstrated that a transitions of care (TOC) program involving acute care, emergency department, and ambulatory care pharmacists reduced all-cause 30-day readmissions for high-risk patients. This study aims to evaluate the effectiveness of a HF-focused TOC program managed by clinical pharmacists.
Methods: This study is a retrospective analysis of a quality improvement initiative at a single VA medical center. Education was provided to acute care and emergency department clinical pharmacists to facilitate the identification of high-risk HF patients at the time of discharge. A TOC program facilitated HF follow-up for these patients with an ambulatory care pharmacist shortly after discharge for further counseling and medication management. The primary outcome is a composite of the number of interventions made by ambulatory care pharmacists during follow-up appointments. Interventions include initiation or discontinuation of medications and/or medication dose adjustments. Major secondary outcomes include 30-day HF readmissions and emergency department visits, the percentage of patients reached from the TOC tool, average number of days from discharge to TOC follow-up, and number of counseling points addressed during pharmacist appointments. Outcomes are collected until the patientâ€™s first post-discharge cardiology appointment, readmission, or emergency department visit. Descriptive statistics will be used to classify study subjects, while Chi square and t-tests will be used to analyze nominal and ordinal data, respectively.
Results and Conclusions: Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:
Identify potential benefits for HF patients enrolled in a pharmacist TOC program.
Describe emerging data supporting the rapid initiation of guideline-directed medical therapy in HF.
Self Assessment Questions:
Which of the following is a potential benefit for HF patients enrolled in a TOC program?
A. Decreased medication access
B. Eliminate need for HF and/or cardiology clinic follow-up
C. Reduced time to HF follow-up after discharge
D. Increased medication side effects
Within what time period have GDMT medications been shown to reduce HF hospitalization or mortality?
A. 30 days
B. 60 days
C. 90 days
D. 180 days
Q1 Answer: C Q2 Answer: A

Review of Sodium-Glucose Transport Protein 2 Inhibitor (SGLT2i) Utilization by Marshall Cardiology Department
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of Cardiology/Heart Failure Society of America Guideline for the Management of Heart Failure. In patients with heart failure with reduced ejection fraction, SGLT2i can reduce hospitalization and cardiovascular mortality, regardless of comorbid diabetes diagnosis. The primary purpose of this review was to evaluate guideline driven SGLT2i use by Marshall Cardiology providers, determine which SGLT2i is being prescribed most, and identify number of prescriptions being sent to Marshall Pharmacy for government-supported 340B assistance due to cost.
Methods: Medication records for patients under Marshall Cardiology provider care were reviewed retrospectively. Males and females 18 years and older were included if they had a visit with a Marshall Cardiology in the past 12 months and a diagnosis of heart failure. Patients were excluded if they did not meet inclusion criteria, were pregnant, breastfeeding or planning to become pregnant, or factors that would prevent SGLT2i use such as eGFR < 20 mL/min/1.73 m2, end stage renal disease or were receiving dialysis, or had history of serious hypersensitivity to SGLT2i or any of their components. Demographic data and SGLT2i status were obtained for patients who met the inclusion criteria. The total number of patients prescribed canagliflozin, dapagliflozin, or empagliflozin was summarized and prescriptions sent to Marshall Pharmacy for 340B assistance were identified. Chi-square tests were used to assess for differences between sex and race for patients prescribed an SGLT2i compared to those who were not prescribed an SGLT2i.
Results/Conclusion: Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.
Learning Objectives:
Discuss the role of sodium-glucose cotransporter-2 inhibitor (SGLT2i) therapy for heart failure with reduced ejection fraction based on the 2022 American College of Cardiology (ACC), American Heart Association (AHA) and Heart Failure Society of America (HSFA) Guideline for the Management of Heart Failure.
Identify patient factors that would prohibit use of SGLT2i.
Self Assessment Questions:
In the 2022 American College of Cardiology (ACC), American Heart Association (AHA) and Heart Failure Society of America (HSFA) Guideline for the Management of Heart Failure, guideline-directed medical therapy for heart failure with reduced ejection fraction includes which of the following?
A. Thiazolidinediones (TZD)
B. Sodium-glucose transport protein 2 inhibitors (SGLT2i)

C. Sulfonylureas (SU)
D. Metformin
Which of the following patient-scenarios would therapy with an SGLTi be contraindicated?
A. Patients with type 2 diabetes on metformin
B. Patients on diuretics
C. Patients on dialysis
D. Patients with high blood pressure
Q1 Answer: B Q2 Answer: C

Safety and Tolerability Profile of Venetoclax 100 mg with Posaconazole in Patients with Acute Myeloid Leukemia

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Regimens for acute myeloid leukemia (AML) are associated with significant bone marrow suppression and prolonged time to neutrophil count recovery. As a result, patients are deemed high risk for infection and guideline recommendations emphasize prophylaxis for the duration of neutropenia. Given wide spectrum of activity, effective prevention of invasive infections, and overall survival benefit, posaconazole represents the fungal prophylaxis drug-of-choice for patients with AML and myelodysplastic syndrome (MDS). Posaconazole has a host of considerations, namely drug-drug interactions stemming from CYP3A4 inhibition. Venetoclax, a selective B-cell lymphoma 2 inhibitor, enhances response to cytarabine and hypomethylating agents in patients unfit for intensive induction regimens. As a CYP3A4 enzyme substrate, venetoclax requires dose reduction to account for increased serum concentrations associated with this pharmacokinetic interaction. Despite manufacturer recommendation of venetoclax 70 mg daily when administered concomitantly with posaconazole, some prescribers dose reduce to venetoclax 100 mg daily.

This single-health system, retrospective, non-inferiority study at UC Health in Cincinnati, Ohio, includes adult patients receiving a decitabine/azacitidine and venetoclax regimen with posaconazole prophylaxis for AML or MDS between November 2018 and December 2022. This cohort will be compared to previously published data of patients receiving venetoclax.

Primary objective will compare the incidence of neutropenia demonstrated by venetoclax 100 mg daily with posaconazole prophylaxis to accepted incidence of neutropenia with venetoclax in the absence of posaconazole prophylaxis throughout chemotherapy induction and consolidation phases. Incidence and duration of anemia and thrombocytopenia during induction and consolidation phases will be assessed as secondary outcomes, as will duration of neutropenia. Incidence of tumor lysis syndrome, average cycle length, and number of patients receiving an abbreviated venetoclax regimen will be reported as safety measures. The impact of venetoclax dosing in the presence of posaconazole on composite complete response, progression free survival, and overall survival will also be evaluated.

Results pending.

Learning Objectives:

Discuss where hypomethylating agents with venetoclax fit into the AML treatment landscape
Outline considerations of concomitant venetoclax and posaconazole administration

Self Assessment Questions:

Venetoclax
A. Combined with HMA has a faster time to response compared to HMA monotherapy
B. Is a BCL-2 inhibitor indicated for the treatment of patients unfit for intensive therapy
C. Is a preferred component of treatment regimens for patients eligible for intensive therapy
D. A and B
Co-administration of venetoclax and posaconazole results in
A. Decrease in venetoclax serum concentrations due to major CYP3A4 induction
B. Decrease in posaconazole serum concentrations due to major CYP3A4 induction
C. Increase in venetoclax serum concentrations due to major CYP3A4 inhibition
D. Increase in posaconazole serum concentrations due to major CYP3A4 inhibition
Q1 Answer: D Q2 Answer: C

Impact of Automated Versus Manual QT/QTc on Antimicrobial Stewardship

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(aQTc) method is more efficient but less accurate than manual QTc (mQTc) calculation. Accuracy of QTc calculation is important as results influence prescribing decisions. Many antimicrobials, such as triazole antifungals, prolong the QT interval and should be avoided in patients with a prolonged QTc interval at baseline due to an increased risk of life-threatening arrhythmias. The purpose of this study is to determine if aQTc reporting is impacting antifungal drug selection in hospitalized patients at UofL Health.

Methods: This is a retrospective, Institutional Review Board approved study of patients treated for candidiasis at UofL Health-UofL Hospital from January 1, 2022, to August 31, 2022. Patients 18 years or older who received treatment with fluconazole, posaconazole, voriconazole, or micafungin and had a baseline EKG will be eligible for inclusion. Patients will be excluded if they had a ventricular pacemaker, QTc less than 430 milliseconds (ms) at baseline, were pregnant, incarcerated, or had an infection source, causative organism, or concomitant medication order that would influence antifungal selection. The primary outcome is incidence of antifungal orders impacted by aQTc, which will be determined by comparing aQTc to mQTc. The primary outcome will be evaluated using pre-specified QTc thresholds and the assumption that prescribers would not order a triazole antifungal in patients with a prolonged QTc. Secondary outcomes include difference between aQTc and mQTc (ms), hospital length of stay, antifungal medication cost, and central line placement. A subgroup analysis of baseline characteristics in patients whose QTc was underestimated or overestimated will be performed.

Results/Conclusions: Data collection is ongoing. Results and conclusions will be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the differences between automated and manual methods of calculating a QTc interval.

Discuss the potential impact of using micafungin over a triazole antifungal when either could be utilized.

Self Assessment Questions:

Fill in the blanks with the most accurate description: Automated QTc results from EKG software are _____ efficient and _____ accurate than a manually calculated QTc.

A. Less, more
B. Less, less
C. More, less
D. More, more

Which of the following disadvantages are associated with micafungin over a triazole antifungal when either option could be utilized?

A. Therapeutic drug level monitoring required
B. Nephrotoxicity
C. QTc prolongation
D. Intravenous access required

Q1 Answer: C Q2 Answer: D

Implementation and Evaluation of a Standard Protocol for Inpatient Chemotherapy Admissions at a Regional Hospital

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Background: Standardized processes for inpatient chemotherapy admissions improve time to chemotherapy administration and decrease length of stay (LOS). According to the American Society of Clinical Oncology (ASCO), chemotherapy administration should occur within 4 hours of a scheduled admission. Process components shown to improve administration time and LOS include having a standard checklist, drawing labs prior to admission (PTA), providing specific admission times for each patient, improving the education and consent process, and entering preadmission notes. Munson Medical Center (MMC) in Traverse City, Michigan, does not currently have a standardized process for scheduled inpatient chemotherapy admissions. By implementing some of these components, MMC would have a more structured, streamlined process that potentially decreases time to chemotherapy administration, LOS, and costs, while increasing patient and staff satisfaction.

Purpose: Evaluate the implementation of a standard protocol for inpatient chemotherapy admissions at a community hospital.

Methods: This is a quasi-retrospective study approved by the IRB. Included patients are those with a cancer diagnosis and a planned admission for chemotherapy. The pre-implementation group includes patients admitted to MMC from November 21, 2022 through January 15, 2023. The post-implementation group includes patients admitted from January 16, 2023 through March 12, 2023. Data collected includes demographics, drug regimen, disease, LOS, type of IV access, time of education and consent, time of lab draws, diagnostic tests, time for drug production, time to administration, and admission time. Primary outcomes are LOS and time from admission to chemotherapy administration. Secondary outcomes include time from order release to chemotherapy administration, frequency of labs drawn PTA, and frequency of signed chemotherapy orders PTA. Data will be analyzed by study investigators using appropriate statistical tests.

Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:
Identify points in the chemotherapy admission process that could potentially cause delays in administration.
Discuss ways to improve the process of administering chemotherapy in an inpatient setting for scheduled admissions.
Self Assessment Questions:
1. Which of the following statements about standardizing the process of admitting a patient for scheduled chemotherapy is incorrect:
A. Has the potential to decrease patient length of stay
B. Has the potential to decrease overall costs for patient hospitalization
C. Has the potential to decrease time to chemotherapy administration
D. Has been shown to decrease patient satisfaction
2. According to the American Society of Clinical Oncology (ASCO), what is the goal for time from scheduled patient admission to chemotherapy administration:
A. 2 hours
B. 4 hours
C. 6 hours
D. 8 hours
Q1 Answer: D Q2 Answer: B

Implementation of Medication Synchronization in Home Delivery and Specialty Pharmacy Operations
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Statement of Purpose: Available literature indicates that medication synchronization programs have contributed to a 3 to 6-fold increase in patient adherence, which translates to a patientâ€™s medication percentage of days covered (PDC) of 80% or more. The purpose of this study is to determine impact of medication synchronization on patient adherence, operational efficiency, material waste, shipping costs, and revenue. At Froedtert Health, the Home Delivery and Specialty Pharmacy (HDSP) is implementing a medication synchronization program utilizing built-in functionality in the electronic pharmacy processing software EPIC Willow Ambulatory (WAM) that was acquired in August of 2022.

Methods: This cohort study is conducted via pre-post implementation analyses. Eligible patients are â‰¥18 years of age, have a PDC<80%, receive 3 or more shipments per month, and fill a minimum of 2 medications monthly to be synchronized. Patients who fill controlled substances or as needed medications only are excluded. One hundred patients who meet inclusion criteria will undergo the pilot phase of the program. The program will include an even mix of patients enrolled in Specialty Pharmacy and in Home Delivery. After the 3-month pilot phase results are analyzed, the tool will be expanded to all eligible patients. The primary outcome of this study is patient adherence, determined by percentage of days covered before and after medication synchronization. Secondary outcomes include percentage of patients who chose to enroll in the medication synchronization program at the end of the pilot phase and 3 months after implementation, the number of shipments per patient before and after medication synchronization, and total cost of shipments sent per patient per month before and after implementation. There will also be a patient and pharmacy team satisfaction assessment with the medication synchronization tool.

Results & Conclusion: Data is currently being collected, and results will be presented at the conference.

Learning Objectives:
Review the benefits of Medication Synchronization for patients of a Specialty and Home Delivery pharmacy.
Discuss the steps to implement Medication Synchronization in a Specialty and Home Delivery pharmacy.
Self Assessment Questions:
According to the literature, which of the following statements describe the benefits of a Medication Synchronization program for patients?
A. Increase the number of times they have to communicate with the pharmacy
B. Decrease the number of trips to or shipments from the pharmacy to receive medication
C. Improve adherence to medications by increasing the percentage of days covered by medication that patients have available to them
D. B and C
Which of the following are crucial considerations for implementation of medication synchronization within a Health System Home Delivery and Specialty Pharmacy?
A. Shipments to the patient per month
B. Shipping costs per month
C. Amount of shipping materials utilized
D. All of the above
Q1 Answer: D Q2 Answer: D

Implementation of Technology-Assisted Final Product Verification (TAFPV) at a Community Teaching Hospital

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Background: Technology Assisted Final Product Verification (TAFPV) is the process by which a Validated Pharmacy Technician verifies the medication product that another technician has filled by means of a technology enabled verification system. Michigan law has allowed TAFPV since October of 2021. This law states that certified pharmacy technicians may perform TAFPV on non-compounded medications with barcodes. Benefits seen at outside institutions following the implementation of similar programs include increased time for pharmacist to do clinical duties, decreased time to cart fills, preserved safety, and pharmacy techniciansâ€™ ability to practice at the top of their licenses.

Purpose statement: The purpose of this initiative is to describe the implementation process of a TAFPV workflow change and assess the benefits that this workflow change may have on the department.

Methods: This was a quality improvement project implemented at Trinity Health Muskegon. Technicians undergo a didactic training session conducted through the PTCB (Pharmacy Technician Certification Board). After passing a written examination they then enter a practical training performed at the hospital by staff pharmacists utilizing a standardized training checklist. Technicians are then initially validated by performing 1,000 final checks of medication orders with an accuracy rate of 99.8% or greater. The revalidation process occurs quarterly for the first year following validation, biannually the second year and yearly thereafter. Key metrics to be assessed include time for medication preparation, time spent verifying medications (difference between pharmacist and technician), accuracy rate differences between pharmacist and technician.

Results in progress.

Learning Objectives:

Explain the process that pharmacy technicians must go through to become validated to perform TAFPV at Trinity Health Muskegon Hospital.
Describe the potential benefits a pharmacy may see by implementing TAFPV at their institution.

Self Assessment Questions:

Which of the following is part of the technician validation process implemented at Trinity Health Muskegon Hospital?
A. Didactic Training
B. Initial Validation
C. Practical Training
D. All of the above

Which of the following is a potential benefit that a pharmacy could see after implementing a TAFPV program at their institution?
A. Increased time for pharmacists to do clinical duties
B. Pharmacy techniciansâ€™ ability to practice at the top of their licenses
C. Increased time to cart fills
D. Both A & B

Q1 Answer: D Q2 Answer: D

Assessment of a Naloxone Distribution Plan in a Veteran Population who Experienced an Opioid-Related Overdose Event

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disorder to prevent deaths due to opioid-related overdose. The Overdose Education and Naloxone Distribution (OEND) dashboard was a tool created to supplement efforts in identifying Veterans with opioid use disorder and increase access, education, and distribution of naloxone. Each VA site was tasked with developing a naloxone distribution plan. The purpose of this study is to assess naloxone distribution and evaluate outcomes in patients who experienced opioid overdose events before and after the initiative at Veteran Health Indiana.

This study will be a retrospective electronic chart review of all patients who experienced an opioid related overdose event at the Richard L Roudebush VA Medical Center from March 1, 2019 â€“ March 1, 2022. The OEND dashboard and International Classification of Diseases (ICD-10-CM) diagnosis codes will be used to identify eligible patients with documented naloxone use for opioid overdose. Patients will not be contacted. Patients will be included if they have a documented opioid-related overdose, naloxone use, and Suicide Behavior and Overdose Report Note. Patients will be excluded from this study if they are not a Veteran, experience an overdose not related to opioids, or have incomplete documentation. The primary outcome is to assess the distribution of naloxone within the year prior to the documented overdose event pre and post the initiation of the naloxone distribution program. Secondary outcomes include the assessment of the number of naloxone doses administered during the overdose event, the substances involved, and the distribution of outpatient naloxone after the overdose event. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify patients that may benefit from an outpatient naloxone prescription
Describe the potential risks and advantages or naloxone distribution programs

Self Assessment Questions:

Which of the following should be considered when identifying patients who may benefit from an outpatient naloxone prescription?
A. An opioid use disorder diagnosis
B. Use of illicit substance(s)
C. Active outpatient opioid prescription
D. All of the above
What could be a potential advantage of a pharmacist led naloxone distribution program?
A. Improve access to and education of naloxone
B. Exploit the stigma associated with naloxone and opioid use disorder
C. Slow the distribution of naloxone
D. Restrict access to naloxone
Q1 Answer: D Q2 Answer: A

Adherence to Direct Oral Anticoagulants (DOACs) for Treatment of Venous Thromboembolism Following an Admission at a Community Hospital

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1000 every year. The American College of Chest Physicians (CHEST) guidelines recommend direct oral anticoagulant (DOAC) medications, such as apixaban or rivaroxaban, as a first line therapy option for initiation and treatment phase for at least 90 days following an acute event. Non-adherence to DOACs is considered a primary reason for treatment failure for patients, placing them at risk of a future thrombotic event. This study will evaluate adherence to DOACs following a hospital admission for an acute VTE event. This is a retrospective single-center chart review adult patients admitted to the hospital or emergency department from January 2022 to September 2022 with a VTE and treated with a DOAC. Primary outcome is the number of patients who were provided with a 90-day supply of a DOAC for treatment of VTE following hospitalization. Secondary outcomes for the study are patient adherence to DOAC treatment following discharge, recurrence of a VTE related event, and to determine which patient-specific factors can be considered directly linked to non-adherence. Data interpretation is in progress. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe the CHEST guideline recommended treatment plan for an acute venous thromboembolism, including medication(s) used and duration of therapy.

Discuss patient-specific factors that can impact venous thromboembolism treatment.

Self Assessment Questions:

What do CHEST guidelines recommend for initial outpatient treatment phase of an acute venous thromboembolism?
A. Vitamin K antagonist therapy for three months
B. DOAC medication therapy for three months
C. DOAC medication therapy for six months
D. Low molecular weight heparin therapy for 3 months
For which of the following patient-specific factors would low molecular weight heparin therapy for acute venous thromboembolism treatment be preferred over DOAC therapy?
A. Patient 65 years of age or older
B. Female gender (no current pregnancy)
C. Asian ethnicity
D. Venous thromboembolism associated with cancer
Q1 Answer: B Q2 Answer: D

Expansion of a Pharmacist-Managed Transitions of Care Tool for Heart Failure Management at a Veterans Affairs Medical Center

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predictor of patient mortality. A previous study at this site showed that a transitions of care (TOC) program is effective at communicating information on high-risk patients between pharmacists in various services, including acute care, the emergency department, and primary care. By focusing on TOC, readmissions for HF may be preventable. The current study evaluates the effectiveness of a heart failure-focused TOC tool managed by clinical pharmacists.

Methods: This study is a retrospective analysis of a single healthcare system at Veteran Health Indiana. Education was provided to both inpatient and outpatient pharmacists who utilize the existing TOC tool, informing pharmacists on how to utilize the tool for the provision of care for Veterans hospitalized with a HF diagnosis or exacerbation. The primary outcome is a composite the number of interventions made by ambulatory care pharmacists after the patient with HF was placed in the TOC tool by an acute care or emergency department pharmacist. Interventions include medication added, medication discontinued, dose increase, or dose decrease. Major secondary outcomes include number of medications added or discontinued, percentage of patients reached from the TOC tool, rate of medication intolerance, average number of days from discharge to follow-up pharmacist appointment, and number of counseling points addressed during pharmacist appointments. Outcomes are collected until the patientâ€™s first post-discharge cardiology appointment, readmission, or emergency room visit. Descriptive statistics will be used to classify study subjects, while Chi square and t-tests will be used to analyze nominal and ordinal data, respectively.

Results/Conclusions: Pending

Learning Objectives:

Identify proper guideline-directed medication therapy for heart failure management.

Review appropriate counseling points for outpatient heart failure management.

Self Assessment Questions:

Which of the following is a guideline-directed medication therapy for heart failure with reduced ejection fraction?

A. Metoprolol tartrate

B. Empagliflozin

C. Semaglutide

D. Hydrochlorothiazide

Which of the following is an appropriate counseling point for outpatient heart failure management?

A. Monitor weight once weekly

B. Restrict daily sodium intake to less than 0.5g daily

C. Monitor blood pressure and heart rate daily

D. Restrict fluid intake to less than 1 liter daily

Q1 Answer: B Q2 Answer: C

Impact of daily quetiapine dose on delirium-free days and related outcomes in adults with intensive care unit delirium

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Delirium is a common occurrence in intensive care unit (ICU) patients and is associated with an increased risk of morbidity and mortality. Guidelines currently recommend not routinely using antipsychotic medications for the treatment of ICU delirium; however, antipsychotics are often still used for this indication in clinical practice. There are currently no recommendations guiding target dosages for quetiapine when used for this indication. The purpose of this study is to evaluate the effect of total daily quetiapine dose on outcomes in critically ill adults with ICU delirium.

This is a single-center, retrospective, cohort study conducted at the University of Cincinnati Medical Center in Cincinnati, Ohio from 2017 to 2022. Adult patients admitted to the ICU that received scheduled quetiapine for at least 48 hours following at least one positive delirium assessment will be included. Exclusion criteria include diagnosis of dementia, psychotic disorders, chronic antipsychotic use, quetiapine initiation or up-titration during chemical paralysis, and primary diagnosis of severe traumatic brain injury, hepatic encephalopathy, or alcohol withdrawal. Patients will be separated into 3 cohorts based on the maximum total daily dose of quetiapine received during ICU admission. Patients in each cohort will then be sub-classified based on analgesia-sedation infusion dosage to reduce bias introduced by the simultaneous receipt of multiple analgesia-sedation agents.

The primary outcome is percentage of delirium-free ICU days compared between patients in each cohort at time of (1) quetiapine initiation and (2) first day of maximum total daily quetiapine dose attainment. Secondary outcomes include the incidence of safety-related quetiapine discontinuation and unplanned dose reduction, in-hospital mortality, ICU and hospital length of stay, and days on mechanical ventilation.

Data collection and analysis are on-going. Results will be presented at Great Lakes Pharmacy Residents Conference in April 2023.

A conclusion will be forthcoming based on results.

Learning Objectives:

Discuss the current recommendations for the prevention and treatment of ICU delirium.

Describe the differences in clinical and safety outcomes associated with different total daily doses of quetiapine when used for ICU delirium.

Self Assessment Questions:

Which of the following does the Society of Critical Care Medicine (SCCM) recommend routinely using for the prevention and treatment of ICU

A. First generation antipsychotics

B. Second generation antipsychotics
C. Statins
D. Non-pharmacologic strategies
Which of the following patients will be included in this study?
A. Patient with no significant PMH presenting to the ED with a Glasgow Coma Score of 3 requiring intubation after a motor vehicle accident.
B. Patient with PMH of lung cancer, anxiety, and chronic pain presenting to the ED with severe COVID-19 symptoms.
C. Patient with PMH of hypertension and chronic alcohol use presenting to the ED with acute alcohol withdrawal.
D. Patient with PMH of type I diabetes, chronic kidney disease, and dementia presenting to the ED with diabetic ketoacidosis.
Q1 Answer: D Q2 Answer: B

Optimization of

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PURPOSE

Cardiovascular immune-related adverse events (iRAEs) are a rare but serious side effect of immune checkpoint inhibitors (ICIs) used to treat many malignancies. While only reported in 1.14% of patients on ICIâ€™s, the mortality rate reaches nearly 50%. Factors such as diabetes, pre-existing cardiac conditions, autoimmune conditions and combination immunotherapy have increased the risk of developing cardiac iRAEs. There is limited guidance on how to monitor patients for cardiac iRAEs. The National Comprehensive Cancer Network recommends considering a baseline electrocardiogram, troponins, lipid panel and/or NTproBNP prior to initiating immunotherapy.
Current ICI monitoring guidelines at Froedtert & the Medical College of Wisconsin do not include guidance on specific cardiac monitoring. However, providers and pharmacists in our oncology clinics have noticed a rise in cardiovascular toxicities in patients on immunotherapy.

METHODS

This quality improvement initiative aims to update our institutionâ€™s current immunotherapy monitoring guideline to reflect cardiovascular monitoring recommendations from national guidance, primary literature and clinical practice. Patients included in this study were adults who received the first dose of immunotherapy at Froedtert within a specified 3-month period. After gaining approval for our guideline updates through our institutional oncology pharmacy and therapeutics committee, then EPIC beacon plans were updated to include proposed monitoring. Lastly, we performed a pre and post guideline implementation chart review to assess cardiovascular iRAE monitoring practices.

OUTCOMES

The primary outcome measures guideline-adherent cardiovascular monitoring before and after implementation of guideline updates. Secondary outcomes include the rate of cardiovascular immune-related adverse events, and cardiovascular events in patients with established risk factors pre and post guideline implementation.

RESULTS/CONCLUSIONS

Final results and conclusions are in process and will be presented at the Great Lakes Conference.

Learning Objectives:

Identify cardiac immune-related adverse events that may be caused by immune checkpoint inhibitor therapy
Recognize factors that increase risk of developing cardiovascular immune-related adverse events

Self Assessment Questions:

Which of the following cardiovascular toxicities may be caused by treatment with immune checkpoint inhbitors?
A. Myocarditis
B. Arrythmias
C. Vasculitis
D. All of the above
In primary literature, which of the following factors demonstrated an increased rate of cardiovascular immune-related adverse events?
A. Obesity
B. Treatment with ipilimumab + nivolumab
C. Chronic kidney disease
D. Age over 65 years
Q1 Answer: D Q2 Answer: B

Narrow vs Extended-Spectrum Antibiotic Selection for the Treatment of Pediatric Appendicitis

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According to the American Academy of Pediatrics (AAP), appendicitis proves to be the most common disease requiring surgery in children. While there has been extensive research in the past decade on antibiotic selection for acute appendicitis, there is no clear guideline recommendation regarding antibiotic use for the management surrounding pediatric appendicitis, in clinical practice both broad-spectrum and narrow-spectrum antibiotics are utilized preoperatively.

Study Purpose:
Quantify and assess the utilization of both broad-spectrum and narrow-spectrum antibiotics that are used in the management of acute appendicitis in children.

Methods:
Retrospective, single center, descriptive study, performed at Munson Medical Center assessing patients treated for acute appendicitis by either the trauma team or pediatric hospitalist team. Patients must be aged 0-21 years of age, have no previous history of appendicitis, and have presented with complicated or non-complicated appendicitis at Munson Medical Center for treatment within the past 5 years (June 2017-June 2022). Data collected from medical records include; patient demographic information, antibiotic selection, specific ICD-10 diagnosis code, post-operative antibiotic (Y/N), name of post-operative antibiotic, discharge with antibiotic (Y/N), name of discharge antibiotic, total days of therapy and specialty of prescribing physician.

Data is currently being collected therefore, results and conclusions will be presented at the conference.

Learning Objectives:
Identify prescribing trends for broad vs narrow spectrum antibiotics at Munson Medical Center for pediatric appendicitis
Recognize appropriateness of antibiotic duration of therapy based on whether the appendicitis was non-complicated or complicated by perforation/abscess
Self Assessment Questions:
Which of the following nationally recognized guidelines recommend narrow-spectrum pre-operative antibiotics for acute appendicitis?
A. American Society of Health-System Pharmacists (ASHP)
B. Surgical Infection Society (SIS)
C. APSA (American Pediatric Surgical Association)
D. Only A and B
Around 13-20% of all pediatric appendicitis cases are perforated, what percentage of those perforated intra-operational cultures result in Pseudomonas aeruginosa surgical site infections?
A. 5
B. 22
C. 45
D. 84
Q1 Answer: D Q2 Answer: B

Quality Improvement of Utilizing Union Hospitalâ€™s Outpatient Pharmacy to Process Patient Prescriptions upon Discharge
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The outpatient pharmacy at Union Hospital has seen an increase in prescription volume for patients discharged from the hospital over the last year. There have been several process changes in the pharmacy to improve efficiency, including barcode scanning, implementation of new workflow queues and a new automated phone line for employee prescriptions refills. The purpose of this study is to improve the process and communication between nursing and providers with the outpatient pharmacy when filling patient prescriptions upon discharge.

Methods
A survey will be distributed to floor nurses, providers and pharmacists that utilize the outpatient pharmacy to gather pre-intervention data on perceptions and barriers with utilizing the pharmacy. The primary intervention will be educating providers and nurses about the outpatient pharmacy processes and improving communication with the status of patient prescriptions. Education sessions will be conducted to provide direct education to the staff and allow time for discussion. Data from the survey will also be utilized to address any identified barriers with the staff using the outpatient pharmacy upon discharge, to continue the process improvement efforts within the outpatient pharmacy. The same survey will then be re-distributed after the intervention to measure differences in perceptions and barriers. The primary outcome will be the difference between survey responses before and after the intervention. Secondary outcomes include measurement of patient prescription volumes filled before and after the intervention in this study.

Results and Conclusion
This research project is ongoing. The results and conclusion will be presented during the Great Lakes Pharmacy Resident Conference.

Learning Objectives:
Identify the benefits of utilizing an in-house retail pharmacy for filling patient prescriptions upon discharge.
Identify the roles and benefits of transitions of care pharmacists.
Self Assessment Questions:
Which of the following is likely the most convenient way to provide new medications to a patient upon discharge?
A. Give the patient hard copy prescriptions to take to their retail pharmacy
B. Send electronic prescriptions to an in-house retail pharmacy to be filled upon discharge
C. Send electronic prescriptions to a community pharmacy to be filled after discharge
D. Send electronic prescriptions to a mail order pharmacy to be filled in 1 week
Which of the following is/are a benefit to having transitions of care services provided by pharmacists based on the inpatient model?
A. Clinical pharmacist review of discharge medication reconciliation for accuracy
B. Medication counseling for new and changed medications
C. Patient assistance with medication cost and co-pays
D. All of the above
Q1 Answer: B Q2 Answer: D

Examining the Effect of Balanced versus Unbalanced Crystalloids on Mortality in Patients Receiving Massive Transfusion Protocol
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Purpose: Hemorrhagic shock is a life-threatening condition that causes an estimated 1.9 million deaths per year worldwide. Resuscitation strategies have changed over the years, with a shift towards massive transfusion protocol (MTP) initiation in patients at high risk of death due to bleeding. MTP encourages early administration of blood products, minimization of crystalloid fluids, reversal of hypothermia and acidosis, and allowance of hypotension. The choice of crystalloid fluid is not clearly defined by consensus guidelines. Patient-specific factors, such as serum electrolytes and baseline renal function, typically guide the treatment decision. The purpose of this study is to determine if balanced or unbalanced crystalloids and volume of crystalloids impact mortality in MTP patients.

Methods: This was a retrospective, single-center, cohort study of trauma and surgical patients necessitating MTP activation from January 1, 2010 - June 30, 2022. The primary outcome was 30-day mortality. The secondary outcomes were time to hemodynamic stability, vasopressor maximum doses and duration, intensive care length of stay (LOS), hospital LOS, and change in 24-hour arterial blood gas values, serum creatinine, serum chloride, and serum sodium values. The data was collected using REDCap and analyzed using descriptive statistics.

Results: Results and conclusions will be presented at the 2023 Great Lakes Pharmacy Residency Conference.
Learning Objectives:
Explain the role of crystalloid fluids in conjunction with blood products in patients requiring massive transfusion protocol (MTP) activation.
Describe any observed efficacy and safety outcomes between balanced and unbalanced crystalloid fluids.
Self Assessment Questions:
Which of the following is a strategy employed in MTP?
A. Early administration of blood products
B. Minimization of crystalloid fluids
C. Mean arterial pressure target of 65 mmHg
D. A & B
What is the difference between balanced and unbalanced crystalloid fluids?
A. Electrolyte content
B. Volume
C. Weight
D. Rate of infusion
Q1 Answer: D Q2 Answer: A

Impact of a Pharmacist-Initiated Vaccine Ordering Process at Two Programs for All-Inclusive Care for the Elderly (PACE) Facilities
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Background: Vaccinations are essential to disease prevention and public health efforts to curb the spread of infectious diseases, especially for older adults (â‰¥65 years of age) who can face many barriers to accessing vaccinations. The Advisory Committee on Immunization Practices (ACIP) recommends older adults be vaccinated with an annual influenza vaccine, a tetanus-containing vaccine every ten years, a herpes zoster vaccine starting at age 50, and a pneumococcal vaccine starting at age 65 or earlier based on risk factors. Trinity Health Muskegon has a partnership with Programs of All-Inclusive Care for the Elderly (PACE) programs in Holland and Muskegon with care provided by ambulatory care pharmacists. As part of the interdisciplinary team, pharmacists provide medication recommendations for optimized care, including vaccinations, through a semi-annual participant reassessment process. In August 2022 a pharmacist-initiated process for ordering vaccinations was incorporated into the participant reassessment process. The goal of this quality improvement initiative is to determine the impact of the pharmacist-initiated vaccine ordering process on patient vaccination rates compared to usual care.
Methods: This two-center retrospective cohort study includes participants who received vaccinations (herpes zoster, pneumococcal, and tetanus) during the review period. Participants will be included even if they received vaccinations outside of the PACE facility. Data will be obtained from a vaccination report from the electronic health record for participants in the pre-intervention phase prior to the COVID pandemic (August 2019-January 2020) and the post-intervention phase (August 2022- January 2023). The primary endpoint is the change in fully vaccinated participants. Secondary endpoints include number and type of vaccine, reassessments resulting in vaccine order, location of administration, documented adverse events, type of healthcare worker ordering vaccine, accepted recommendations, and number of patient declinations.
Results/Conclusion: Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

List the immunization schedule for older adults (â‰¥65 years of age).
Describe the role of the ambulatory pharmacist in the vaccine ordering processing process at the PACE facility.

Self Assessment Questions:

Based on CDC guidelines, which of these vaccines needs to be repeated every 10 years:
A. Tetanus
B. Pneumococcal
C. Influenza
D. Zoster

The ambulatory pharmacist is responsible for all the following duties during the new participant reassessment process including:
A. Recommending vaccines based on CDC guidelines
B. Obtaining participant consent
C. Placing orders for vaccines
D. All of the above

Q1 Answer: A Q2 Answer: D

Impact of Pharmacist Involvement in Medication Reconciliation of Emergency Department Behavioral Health Patients

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PURPOSE: A medication reconciliation is the process of comparing a patientâ€™s medication orders to the medications the patient has been taking prior to admission. Through this process, medication discrepancies can be identified that could be a source of harm. Obtaining a medication history to complete the medication reconciliation process is further complicated in behavioral health patients. Numerous studies have shown that pharmacist involvement improves the accuracy of the medication reconciliation process. Few studies, however, have evaluated the impact of pharmacist-led medication reconciliations in the behavioral health patient population. At the authorâ€™s institution, there is not a standard process for completing medication reconciliations for patients in the emergency department (ED). The primary aim of this study is to evaluate the impact of pharmacist-led medication reconciliation in behavioral health patients in the ED.

METHODS: This was a single center, pre- and post-implementation quasi experimental study of patients admitted to the ED at Trinity Health Oakland. Patients with a behavioral health visit, a populated Surescripts medication dispense history, and an ED length of stay of at least 12 hours were included. The retrospective component consisted of chart review for patients admitted to the ED from August 1st, 2022 to October 31st, 2022. The medications ordered during the patientsâ€™ ED stay was compared to the dispense history to identify discrepancies. The prospective component occurred November 1st, 2022 to January 31st, 2023 and consisted of a pharmacy resident and a pharmacy student conducting medication histories of behavioral health patients in the ED. The pharmacy teamâ€™s completed medication history was compared to the medications ordered to identify discrepancies. The primary endpoint is the number of discrepancies identified and the secondary endpoints are the type of discrepancy and the time to initiation of maintenance medications.

Results and conclusion will be presented at Great Lakes Pharmacy Resident Conference

Learning Objectives:

Review the impact of pharmacist-led medication reconciliation

Discuss barriers in obtaining a medication history in behavioral health patients

Self Assessment Questions:

What is the first step in the medication reconciliation process?

A. Conducting a medication history

B. Making therapy recommendations to the provider

C. Ensuring that the patient is a good historian

D. Asking the provider to not order any medications until the pharmacist has looked over the patientâ€™s medications

Which of the following is a challenge to conducting an accurate medication history in a behavioral health patient?

A. Increased medication adherence

B. Polypharmacy

C. Lack of comorbidities

D. Increased likelihood of residence at a facility

Q1 Answer: A Q2 Answer: B

Pharmacy Technician-Lead Refill Authorization Service Team: Patient and Provider Impact Across Multiple Practices

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Purpose: Prescription refill authorizations are commonly managed by physicians and office employees. High volumes of refill requests and long turnaround times contribute to physician burnout and patient non-adherence. Licensed pharmacy technicians receive similar medication training to medical assistants who currently approve refill authorizations. The purpose of this study is to further validate previous studies utilizing technicians in this role and provide data and examples relating to catching and resolving refill request errors.

Methods: This retrospective chart review was performed at three different Indiana University (IU) Health Family Medicine Clinics from February 18th, 2022, through February 18th, 2023. All medication refill requests were reviewed by a centrally located team of six licensed pharmacy technicians which were received by a pharmacy or patient via an electronic prescription, portal request, voicemail, or fax. Refill authorization requests were processed by the technicians following established protocols. Patients were included in this study if their original prescription was written by a provider of the associated clinics with a medication refill request processed by this refill team and, if necessary, forwarded to their respective physicianâ€™s office for further review. The primary endpoint of this study is the completion and non-completion rates of processed prescription refill requests. The secondary endpoints are the average time per refill following protocol, average turnaround time, accuracy and error rate, and number of prescription request errors caught by technicians. All data was collected manually by technicians and tabulated into a virtual spreadsheet.

Results/Conclusion: Results will be presented at the Great Lakes Pharmacy Conference.

Learning Objectives:

Explain the positive impacts of streamlined refill requests processed by pharmacy technicians

Identify the impact of pharmacy technicians on improving prescription quality

Self Assessment Questions:

Which of the following is a positive impact of streamlining refill requests with pharmacy technicians?

A. Decreases pharmacy technician burnout rates
B. Reduce turnaround time for controlled medication requests
C. Increase medication adherence
D. Reduction in pharmacist workload
Interventions made by pharmacy technicians can improve which of the following aspects of prescription quality?
A. Ensure follow-up appointments are made to assess the appropriateness of medications
B. Making therapeutic interchanges to help with financial assistance
C. Correcting dose errors on refill requests using chart notes review
D. A and C
Q1 Answer: C Q2 Answer: D

Gastrointestinal Bleeds in Patients Receiving Therapeutic Anticoagulation With Direct Oral Anticoagulants or Warfarin: Evaluation of Odds Ratios

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related bleeds is complicated by many facets including severity of bleeding, intensity of anticoagulation, and most importantly, patient specific characteristics. Novel direct acting anticoagulants (DOACs) have shown an improved safety profile over longstanding agents such as warfarin. Additionally, the ACC/AHA Atrial Fibrillation and the CHEST VTE guidelines both recommend the use of DOACs over warfarin due to an improved safety profile. However, data surrounding patient characteristics that influence the frequency of GI bleeding between warfarin and DOAC users is inconclusive. The objective of this study is to compare patient-specific factors that influence the prevalence of GI bleeding between DOAC and warfarin users hospitalized for GI bleeding.
Methods: This study is a single-system, retrospective chart review of patients hospitalized for GI bleeds while using DOACs or warfarin at SwedishAmerican Hospital. Electronic health records were used to identify patients between July 1, 2021, and June 30, 2022. Pertinent data collected includes anticoagulation usage, length of hospital stay, prior to admission medication list, medical history, hemoglobin, serum albumin, serum creatinine, INR, and concurrent NSAID or antiplatelet use. The primary objective is to compare patient characteristics that influence the prevalence of GI bleeding in patients receiving a DOAC or warfarin hospitalized for a GI bleed. Secondary objectives are to compare the relative risk of GI bleeding in patients who take concomitant NSAIDs or antiplatelets, and to compare which patient characteristics are associated with longer hospital stays. Results of this study will be utilized to advance anticoagulation prescribing habits and identify areas of improvement for patient outcomes.
Preliminary Results: Twenty-six warfarin patients and eighty DOAC patients met inclusion criteria.
Conclusions: Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.
Learning Objectives:
Classify the prevalence of gastrointestinal bleeds in direct oral anticoagulants (DOACs) compared to warfarin
Recognize risk factors for gastrointestinal bleeds
Self Assessment Questions:
Which of the following direct acting oral anticoagulants has a lower relative risk of gastrointestinal bleeding compared to warfarin, as shown in its landmark phase III clinical trial?
A. Apixaban
B. Edoxaban
C. Rivaroxaban
D. They all have a lower relative risk of gastrointestinal bleeding than warfarin
Which of the following is the most common risk factor for upper gastrointestinal bleeding?
A. Crohn's Disease
B. Esophagitis
C. Gastric ulcer
D. Portal hypertension
Q1 Answer: A Q2 Answer: C

Management and Risk Factors for Leukopenia Following Heart Transplant

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Purpose:
Leukopenia is a side effect of immunosuppression and antimicrobial prophylaxis post-heart transplant that has been associated with an increased risk of rejection and infection. Multiple studies have shown mycophenolate, valganciclovir, and sulfamethoxazole/trimethoprim contribute to post-transplant leukopenia. Often, the management of leukopenia includes stopping one of those agents. The goal of this study was to examine risk factors and management of leukopenia following heart transplant.

Methods:
This was a single center, retrospective chart review that included 72 adult patients who received a heart transplant at University Hospitals Cleveland Medical Center from January 2017 through December 2021. Patients were separated into two groups based on the development of leukopenia (WBC < 4000 cells/mm3) and were compared to identify risk factors. The primary outcome was to examine risk factors for developing leukopenia. The secondary outcome included the management of leukopenia post-heart transplant. Results were analyzed using logistic regression, Kaplan-Meier estimator, and descriptive statistics.

Results:
Leukopenia developed in 57 patients (79%) within one year of transplant. Baseline characteristics were similar among groups except for a significantly higher serum creatinine (Scr) in the leukopenia group (p=0.009). For the primary outcome, 86% of patients with leukopenia had a baseline Scr â‰¥ 0.945 mg/dL (p=0.393). Patients whose donors were CMV IgG seropositive were more likely to develop leukopenia than those with CMV IgG seronegative donors. For the secondary outcome, the 90-day dose of mycophenolate was significantly lower in the leukopenia group (mean 3000 mg/day vs 2325 mg/day, p=0.003), likely because the dose was lowered for leukopenia. Other management included the discontinuation of mycophenolate (38.6%), valganciclovir (24.6%) and sulfamethoxazole/trimethoprim (29.8%).

Conclusion:
The risk factors for developing leukopenia after heart transplant included donor CMV status and higher Scr at baseline. Management of leukopenia included the discontinuation and reduction of mycophenolate as well as the discontinuation of prophylactic antimicrobials.

Learning Objectives:
Discuss leukopenia in solid organ transplant recipients
Identify the risk factors and management of leukopenia in heart transplant recipients
Self Assessment Questions:
What is one of the clinical implications of leukopenia?
A. Increased risk of infection
B. Decreased risk of rejection
C. Decreased risk of infection
D. Decreased need for immunosuppression
What is one way we can manage leukopenia?
A. Increase mycophenolate mofetil dose
B. Increase sulfamethoxazole/trimethoprim dose
C. Discontinue cyclosporine
D. Discontinue valganciclovir
Q1 Answer: A Q2 Answer: D

Trimethoprim-Sulfamethoxazole vs Non-Trimethoprim-Sulfamethoxazole Treatments for Stenotrophomonas Pneumonia
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Purpose: Trimethoprim-sulfamethoxazole (TMP-SMX) is the preferred agent for treating Stenotrophomonas maltophilia pneumonia per the Infectious Disease Society of America (IDSA) guidelines for treatment of antimicrobial-resistant gram-negative organisms. Although TMP-SMX is listed as the preferred therapy, there is minimal clinical evidence that exists to support a standard of care antibiotic regimen for use in S. maltophilia pneumonia. The purpose of this study is to compare the effectiveness of TMP-SMX to minocycline, tigecycline, and moxifloxacin in the treatment of S. maltophilia pneumonia.

Methods: This is a retrospective cohort study analyzing clinical outcomes between TMP-SMX and minocycline, tigecycline, and moxifloxacin. Patients admitted to Indiana University Health (IUH) Methodist and University hospitals between 1/1/2019 â€“ 8/1/2022 will be included if they are greater than 18 years of age, have a monomicrobial culture results for S. maltophilia from bronchoalveolar lavage, sputum sample, and/or aspirate sample, have pneumonia utilizing National Healthcare Safety Network (NHSN) definition, and received a minimum of 7 days of susceptible therapy with TMP-SMX, minocycline, tigecycline, or moxifloxacin. Subjects will be excluded if they receive combination antibiotic therapy with any of the studied agents, have cystic fibrosis, or were readmitted after 90 days from cessation of index treatment. Patients will be stratified based upon receipt of index treatment. The primary outcome is rate of relapse pneumonia, confirmed by repeat monomicrobial culture and NHSN clinical pneumonia definition, within 90 days of cessation of index treatment. Secondary endpoints will assess hospital length of stay, duration of antibiotic therapy, new onset hyperkalemia, new onset acute kidney injury, and disease progression between both treatment arms. Categorical data will be analyzed using Chi-Square tests and continuous data will be analyzed using T-tests.

Results and Conclusion: Data collection and analysis are currently in progress. Final results will be presented at the 2023 Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Review IDSA recommendations for the treatment of S. maltophilia pneumonia.

Discuss efficacy and safety of TMP-SMX and minocycline, tigecycline, and moxifloxacin for the treatment of S. maltophilia pneumonia.

Self Assessment Questions:

Which of the following is a possible treatment options for S. maltophilia pneumonia per the IDSA guidelines for treating antimicrobial-resistant gram-negative organisms.

A. Amoxicillin/Clavulanate
B. Daptomycin
C. Metronidazole
D. Tigecycline

Which of the following is the most frequently encountered adverse effect of TMP-SMX?

A. Cardiomyopathy
B. Heptotoxicity
C. Hyperkalemia
D. Pulmonary fibrosis

Q1 Answer: D Q2 Answer: C

Pharmacoeconomic analysis of one-time intravenous antibiotic doses in the emergency department

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Purpose:
Intravenous antibiotics are often administered in the emergency department even though an oral antibiotic could be used instead without affecting outcomes. Increased costs are incurred because of this usage, including: IV form of medication compared to oral, nursing administration costs, pharmacy cost to prepare the medication, and increased length of stay and overhead costs. The purpose of this study was to directly compare the healthcare-related costs incurred by patients who received a one-time IV antibiotic dose in the ED and were then discharged home on oral antibiotics to patients who were discharged home on oral antibiotics.

Methods:
This was a retrospective chart review involving patients 18 years of age and older who visited the Veteran Health Indiana ED and were discharged home on an oral antibiotic between the dates of 4/30/2020 and 4/30/2022. Patients were split into two groups: those who received a one-time IV antibiotic dose in the ED prior to discharge and those who did not. Patients who left the ED against medical advice were excluded, as were patients who were admitted to the hospital, transferred to another hospital, or transferred to a facility for continued care. The primary outcome was the difference in cost between the two groups. The secondary outcome was the difference in overall time spent in the ED between the two groups. The two groups were evaluated for severity of illness at presentation. Patients were evaluated for admissions or infections 30-days prior to ED visit, and subsequent clinical outcomes were also evaluated, including ED-revisit rate and hospitalization at 30 days post-initial visit. Data collected was de-identified through utilization of random study number assignments.

Learning Objectives:
Express the time and monetary cost of improper use of antibiotics
Recognize typical patients that do not need intravenous antibiotics
Self Assessment Questions:
Which of the following patients is unlikely to benefit from use of intravenous antibiotics?
A. 72 year-old male patient, ESI 4, CC of SOB, (+) MRSA bacteremia 3 weeks prior
B. 62 year-old female patient, ESI 2, CC of SOB and productive cough
C. 35 year-old male patient, ESI 2, CC of redness/itchiness on left arm
D. 56 year-old female patient, ESI 3, CC of burning pain on urination
What is a cost associated with the administration of intravenous antibiotics?
A. Extended time spent in the hospital compared with oral antibiotic use
B. Supplies needed for infusion
C. Need for expertise of multiple healthcare professionals
D. All of the above
Q1 Answer: D Q2 Answer: D

Assessing insulin requirements and weight change after addition of glucagon-like peptide receptor agonists in the treatment of Veterans with Type 2 Diabetes

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Purpose: Insulin has a high risk of causing hypoglycemia and weight gain in patients with type 2 diabetes. Alternatively, glucagon-like peptide receptor agonists (GLP-1 RA) are associated with decreased risk of hypoglycemia, and can lead to weight loss and decreased insulin requirements. The objective is to determine the percent decrease in insulin requirements and weight change when a GLP-1 RA is added to insulin in veterans with type 2 diabetes. Methods: In this quality improvement project, a retrospective chart review was performed on patients with type 2 diabetes who were on insulin and started on a GLP-1 RA by a VA Illiana Health Care System Clinical Pharmacist Practitioner between January 2020 and January 2022. Primary endpoints included the percent reduction in insulin requirements and change in weight since starting the GLP-1 RA. The endpoints were evaluated with the baseline data at start of GLP-1 RA vs 3 months after max dose. Results: 98 patients were included in the initial data collection during the selected time frame. Of the 98 patients, 56 met inclusion criteria. Insulin total daily dose (TDD) decreased in 75% (42) of patients. Of the 42 patients who had decreased insulin requirements, the average TDD decrease was (41.2%) 28.9 units. Of the 52 patients who had weight data, 84.6% (44) patients loss weight. Of the 44, there was an average 5.5% weight loss (average 14.1 pounds.) 41.1% (23) of the 56 patients included reported hypoglycemia. Conclusion: GLP-1 RAs are associated with a decrease in insulin requirements, weight loss, and improved A1c, therefore may be effective agents to initiate to achieve these outcomes. The limitations of this quality improvement project include the small sample size, GLP-1 RA started by only pharmacists and not primary care providers, and the retrospective design.
Learning Objectives:
Recognize the effectiveness of GLP-1 RA initiation in decreasing insulin requirements
Review the impact of pharmacist initiated GLP-1 RA on weight loss
Self Assessment Questions:
1. Of the patients that experienced a decrease in insulin requirements, how much were insulin requirements decreased on average (in units) after GLP-1 RA initiation?

A. 32.4 units
B. 28.9 units
C. 10.5 units
D. 25.5 units

2. Of the patients that loss weight, which of the following reflects the average percent decrease in weight?
A. 0.045
B. 0.1
C. 0.055
D. 0.15

Q1 Answer: B Q2 Answer: C

Quality improvements to the Veteran Health Administrationâ€™s (VHA) first syringe service program (SSP)

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integration into the healthcare systems. VHAâ€™s first SSP was started in 2017 at the VA Illiana Healthcare System (VAIHCS) in Danville, IL, and has been replicated at many other VHA facilities. The purpose of this project is to address two pieces that have been missing from local implementation, including 1) a platform for the voices of people who use drugs (PWUD) to shape the program and 2) a summary of what preventative healthcare services are being provided to PWUD.

Methods: The pharmacist will collaborate with the social work service for homeless Veterans to identify and engage Veterans who actively use drugs. The pharmacist will contact the Veterans to interview them regarding their experiences in VA healthcare and their suggestions for improvement to the local SSP. The pharmacist will offer supplies and services, including, but not limited to sterile syringes, naloxone, fentanyl test strips, safe injection kits and linkage to buprenorphine, and infection screening/vaccinations. The pharmacist will also review the Veteranâ€™s electronic health record to assess what supplies and services have been provided and compare findings to expert opinion recommendations on harm reduction practices in the clinical setting. Where absent, the pharmacist will enter recommendations to the Veteranâ€™s relevant providers. Findings will be shared on a national VHA level so that they may be applied to other VHA facility SSPs and encourage the expansion of clinical pharmacists into the harm reduction setting.

Data is currently being collected, and results will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:
Identify harm reduction offerings in the healthcare setting
Describe basic preventative care recommendations for people who use drugs

Self Assessment Questions:
What harm reduction resources may be available at Syringe Service Programs?
A. Naloxone
B. Sterile syringes
C. Healthcare services
D. All of the above

Which of the following are common preventative care recommendations for people who use drugs?
A. Screen for HIV > q1yr
B. Screen for HCV > q1yr
C. Screen for HBV & HAV > q1yr
D. All of the above

Q1 Answer: D Q2 Answer: D

Efficacy and Safety of Dose-Adjusted EPOCH-R Compared to R-HyperCVAD for Newly Diagnosed High-Grade Diffuse Large B-cell Lymphoma

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Diffuse large B-cell lymphoma (DLBCL) accounts for about 25-30% of all Non-Hodgkinâ€™s lymphomas making it the most common type of lymphoma. High-grade (HG) B-cell lymphoma is a subtype of DLBCL which is characterized by specific translocations indicative of a poor prognosis. Well-established regimens for DLBCL such as R-CHOP (rituximab, cyclophosphamide, doxorubicin, vincristine, and prednisone) have inferior efficacy in this population. Although the optimal regimen has not been determined for newly diagnosed HG-DLBCL, more intensive regimens such as DA-EPOCH-R (dose-adjusted etoposide, prednisone, vincristine, cyclophosphamide, doxorubicin and rituximab) and R-HyperCVAD (rituximab, cyclophosphamide, vincristine, doxorubicin, dexamethasone alternating with high-dose methotrexate and cytarabine) are national comprehensive cancer network (NCCN) recommended treatment options. DA-EPOCH-R and R-HyperCVAD have each been compared to R-CHOP, but data comparing DA-EPOCH-R and R-HyperCVAD is lacking. Studies are needed to further investigate the role of each regimen and to identify if one is preferred over the other.
Purpose:
The purpose of this study is to compare the efficacy and safety of DA-EPOCH-R and R-HyperCVAD in patients receiving initial therapy for HG-DLBCL.
Methods:
This single-center retrospective chart review included adult patients who received DA-EPOCH-R or R-HyperCVAD as initial therapy for transformed or newly diagnosed DLBCL described as high grade (per NCCN definition or pathology reported â€œhigh grade featuresâ€ or double expresser (positive MYC and BCL2 immunohistochemistry/immunostaining) at University Hospitals Cleveland Medical Center (UHCMC) between 12/1/2012 and 12/1/2020. The primary efficacy outcome is response rate defined as complete, partial, or refractory response determined by the Lugano response criteria for Non-Hodgkin's lymphoma per 18F-fluorodeoxyglucose FDG positron emission tomography (PET)â€“computed tomography (CT). Primary safety outcomes include rate of infection, neutropenia, thrombocytopenia, dose decreases, or regimen switch/discontinuation. Additional outcomes include rate of relapse, rate of stem cell transplant, and all-cause mortality.
Results and Conclusions will be presented at Great Lakes Pharmacy Residency Conference.

Learning Objectives:
Discuss the NCCN guideline treatment recommendations for high-grade diffuse large B-cell lymphoma
Describe the risks and benefits of selecting intensive chemotherapy regimens
Self Assessment Questions:
The national comprehensive cancer network (NCCN) Guideline for B-cell Lymphomas recommends all regimens for initial treatment of high-grade diffuse large b-cell lymphoma (HG-DLBCL) EXCEPT FOR:
A. R-CHOP (rituximab, cyclophosphamide, doxorubicin, vincristine, and prednisone)
B. R-ICE (rituximab, ifosfamide, carboplatin, and etoposide)
C. DA-EPOCH-R (dose-adjusted etoposide, prednisone, vincristine, cyclophosphamide, doxorubicin, and rituximab)
D. R-HyperCVAD (rituximab, cyclophosphamide, vincristine, doxorubicin, dexamethasone alternating with high-dose methotrexate and cytarabine)
Which regimen for HG-DLBCL is identified as a â€œpotentially toxic regimenâ€ per the NCCN guidelines and should only be initiated after careful consideration of performance status and comorbidities?
A. R-CHOP (rituximab, cyclophosphamide, doxorubicin, vincristine, and prednisone)
B. R-ICE (rituximab, ifosfamide, carboplatin, and etoposide)
C. DA-EPOCH-R (dose-adjusted etoposide, prednisone, vincristine, cyclophosphamide, doxorubicin, and rituximab)
D. R-HyperCVAD (rituximab, cyclophosphamide, vincristine, doxorubicin, dexamethasone alternating with high-dose methotrexate and cytarabine)
Q1 Answer: B Q2 Answer: D

Evaluation of Bispectral Index Monitoring in Patients Receiving Concomitant Paralytics and Ketamine

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Purpose: Ketamine produces many effects significant for critically-ill patients. Ketamine is a NMDA receptor antagonist that produces amnestic and analgesic effects by inhibiting glutamate. Ketamine also acts on opioid receptors which augments opioid receptor function and reduces tolerance. It may also provide a vasopressor-sparing effect through inhibiting catecholamine reuptake and stimulating adrenergic neurons. When using ketamine-based regimens, sedation monitoring may be inconsistent. Bispectral Index (BIS) is a sedation monitoring tool utilized in patients requiring paralytics. Some reports indicate that addition of ketamine for sedation may increase stable BIS scores. However, most of this data is found in short-term neuromuscular blockade and sedation during procedures. The purpose of this study is to compare the effects of sedation on BIS monitoring when using paralytics with ketamine and non-ketamine sedation regimens.
Methods: This will be a retrospective, single center, before and after study conducted in a tertiary care community hospital in Kentucky. Those evaluated will be mechanically ventilated patients receiving paralytics and sedation with and without ketamine, where sedation is measured using BIS monitoring. Patients who receive ketamine for the entirety of the regimen and vulnerable populations will be excluded. The primary outcome of this study will be the percentage of BIS scores within goal sedation range (30-50) at 24 and 48 hours pre- and post-ketamine initiation. Secondary outcomes will include average BIS, sedative use, MME burden, and vasopressor use each at 24 and 48 hours pre- and post-ketamine initiation. The Shapiro-Wilk test will be used for normality. A paired t-test or Wilcoxon sign rank test will be used for continuous data. A Chi Square test, Fischerâ€™s exact, or McNemarâ€™s test will be used for categorical data. These tests will use a 95% confidence interval and an alpha of 0.05 for significance.
Results/Conclusions: To be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:
Discuss the multiple mechanisms of action of ketamine
Describe the effect of continuous infusion ketamine on sedation monitoring in patients requiring neuromuscular blockade
Self Assessment Questions:
Which of the following is a factor in ketamineâ€™s vasopressor sparing-effect?
A. Provides large IV fluid volume
B. Ketamine is an alpha-1 agonist
C. Inhibits reuptake of catecholamines
D. Increases cardiac output
Bispectral Index is used for sedation monitoring in patients on neuromuscular blockade agents. How does it measure sedation?
A. RASS & Vitals
B. Vitals & Train of Four
C. EEG, Vitals, and Train of Four
D. EEG & EMG
Q1 Answer: C Q2 Answer: D

Retrospective review of deprescribing trends after initiation of SGLT2 inhibitors to account for known physiologic effects
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renal protective properties. Many patients with comorbidities such as type 2 diabetes, chronic kidney disease, and heart failure are being initiated on SGLT2 inhibitors. Considering their disease state(s), patients are likely on multiple other maintenance medications, such as additional diabetic medications, antihypertensives, and diuretics. The goal of this study is to investigate which agents should be deprescribed or dose adjusted after prescribing an SGLT2 inhibitor during an inpatient admission to improve care and prevent safety events in the future.

The current study is a retrospective cohort that will include a descriptive review of patients within the TriHealth system between January 1, 2021 through June 30, 2022. This study will include patients 18 years and older that have been initiated on an SGLT2 inhibitor at an inpatient visit who were previously taking 2 or more medications from angiotensin converting enzyme inhibitors/angiotensin receptor blockers/angiotensin receptor/neprilysin inhibitor, diuretics (e.g. loop, thiazide), or insulin and any other anti-diabetic agents including oral therapies. Patients must also have completion of a medication history interview by a pharmacist during the inpatient encounter and have one outpatient follow-up visit within the TriHealth system within 30 days after discharge. Patients will be excluded if they do not meet inclusion criteria, if they are part of a protected patient population, or if they are on dialysis. Data will be collected through EPIC chart reviews and descriptive statistics will be used to assess the number of patients who had agents deprescribed when initiated on SGLT2 therapy and to assess trends in deprescribing. This study is approved by the TriHealth Institutional Review Board.
Learning Objectives:
Review the mechanism of action of sodium glucose cotransporter-2 (SGLT2) inhibitors and their FDA indications
Discuss some of the common side effects of SGLT2 inhibitors in relation with medications used to treat heart failure, diabetes, and chronic kidney
Self Assessment Questions:
Which of the following is NOT an FDA approved indication for sodium glucose cotransporter-2 (SGLT2) inhibitors?
A. Heart failure with preserved ejection fraction
B. Type 1 diabetes
C. Type 2 diabetes

D. Chronic kidney disease

The RECEDE-CHF trial concluded that the combination therapy of SGLT2 inhibitors with loop diuretics required a dose reduction of loop diuretics due to concerns of what adverse effect(s)?

A. Hypotension
B. Hyperglycemia
C. Hypovolemia
D. Both A and C

Q1 Answer: B Q2 Answer: D

Assessing the Impact of Albumin in Addition to Loop Diuretics on Fluid Deresuscitation in Septic Shock Patients in the Intensive Care Unit

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Purpose: In patients with septic shock, studies suggest a net positive fluid balance increases mortality. Few studies, however, have outlined the most effective agents for fluid deresuscitation in these patients. A frequently used approach is the use of loop diuretics. Hypertonic (25%) albumin currently lacks data supporting its use for deresuscitation in this population but has shown promise in other critical care disease states. In this study, the utility of hypertonic albumin in addition to intravenous loop diuretics for fluid deresuscitation in septic shock will be assessed by reviewing the degree of diuresis obtained with the addition of albumin.

Methods: This retrospective cohort study will aim to assess the benefit of the addition of hypertonic albumin to loop diuretics in critically ill patients with septic shock at a 433-bed community hospital in Kentucky. This study will compare the degree of diuresis in two cohorts of patients who will be deresuscitated with either intravenous loop diuretics alone or loop diuretics plus hypertonic albumin. Patients â‰¥ 18 years of age in the intensive care unit with a primary or secondary diagnosis of septic shock receiving intravenous loop diuretics with or without hypertonic albumin will be included. Patients with renal replacement therapy requirements, contraindications to loop diuretics, chronic kidney disease stage IV or end stage renal disease, and patients receiving oral loop diuretics will be excluded. Data will be collected via electronic medical record chart review. The primary outcome will be urine output at 24, 48, and. 72 hours. Secondary outcomes include intensive care unit length of stay, hospital length of stay, mortality, 30-day readmission, and cost of treatment. Data will be evaluated for normality and appropriate statistical methods will be utilized to compare continuous and categorical variables. All data will use a 95% confidence interval and an alpha of 0.05 for significance.

Learning Objectives:

Discuss the current practice for fluid deresuscitation in critically ill septic shock patients.
Describe the utility of hypertonic albumin for fluid deresuscitation in patients with septic shock.

Self Assessment Questions:

1. What are the current first line agent that guidelines recommend for fluid deresuscitation in critically ill patients with septic shock?

A. Chlorothiazide
B. Bumetanide
C. Albumin
D. None of the above

2. In some ICU disease states other than septic shock, what medication, in combination with loop diuretics, has shown promise for increasing urine output and improving fluid balance?

A. Furosemide
B. Hydrochlorothiazide
C. Albumin
D. Normal Saline

Q1 Answer: D Q2 Answer: C

Evaluation of Quetiapine Monotherapy vs Quetiapine plus Oxazepam for ICU Agitation on Post-Extubation ICU Length of Stay

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increased ICU and hospital length of stay (LOS). Current Society of Critical Care Medicine (SCCM) guidelines do not routinely recommend pharmacotherapy for the treatment or prevention of delirium. Despite this, antipsychotics and benzodiazepines (BZDs) are commonly used for both ICU delirium and agitation in clinical practice. The purpose of this study was to determine the impact of quetiapine monotherapy versus combination therapy with BZDs on post-extubation ICU length of stay in patients experiencing ICU delirium or agitation.

Methods: A retrospective, single-center, cohort study will be conducted at a 433-bed tertiary care hospital in central Kentucky. Patients will be included in this study if they are 18 years or older and admitted to the ICU with subsequent intubation requiring treatment for delirium or agitation. Patients who died or who were unable to be extubated will be excluded from this study. In addition, patients that required reintubation, were on an antipsychotic or benzodiazepine prior to admission, or were admitted for COVID-19 will also be excluded. Electronic medical records will be used to collect information on patients during their admission. Patients will be stratified into two groups to assess for differences in post-extubation ICU length of stay. Differences will be assessed for those who received quetiapine monotherapy compared to those who received quetiapine in combination with oxazepam. Secondary outcomes include post-ICU length of stay, total post-extubation length of stay, need for an adjunctive treatment agent, maximum quetiapine dose required, and 30-day readmission. Data will be evaluated for normality and appropriate statistical methods will be utilized to compare continuous and categorical variables. All data will use a 95% confidence interval and an alpha of 0.05 for significance.

Results: Data collection is in progress.

Learning Objectives:
Discuss the consequences of ICU associated agitation and/or delirium
Describe different treatment approaches for patients who experience ICU associated agitation and/or delirium
Self Assessment Questions:
Which of the following has been associated with ICU delirium and agitation?
A. Increased ICU length of stay
B. Mortality
C. Polypharmacy at discharge
D. Increased risk of readmission
The PADIS guidelines recommend which of the following for the treatment of delirium?
A. As needed IV haloperidol
B. As needed IV lorazepam
C. Quetiapine at bedtime
D. None of the above
Q1 Answer: A Q2 Answer: D

Pharmacist-provided educational intervention and its impact on medical resident knowledge and comfort level with continuous glucose monitors (CGMs)

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Purpose:
CGMs are an integral component of diabetes care. The American Diabetes Association recommends CGMs be offered to all patients on insulin who can use them safely. Integrating CGMs into clinical practice can be challenging for several reasons, including data overload, cost, and the need for provider education on data interpretation. The purpose of this study is to evaluate the impact of pharmacist provided CGM education on medical resident knowledge and comfort level.
Methods:
This is an IRB approved prospective education intervention study. Medical residents were invited to attend a 45-minute lecture given by a pharmacist. The lecture reviewed different CGMs, data analysis interpretation, ordering and patient counseling. Before the presentation residents were asked to complete a pre-education survey assessing prior knowledge and comfort level with CGMs. Directly following and up to one week after attending the presentation, residents were asked to complete a second survey (post-education survey 1), identical to the pre-presentation survey. A third identical survey (post-education survey 2) was distributed 4-6 weeks after the educational session to assess knowledge retention. To evaluate the primary outcome of the impact of pharmacist CGM education on medical resident knowledge and comfort level, the number of correct answers on the pre-education survey and post-education survey 1 will be compared.
Results/Conclusion:
Data collection is ongoing. Thirty-three residents attended the pharmacist lecture and completed the pre-education survey, 22 (67%) stated they had no previous formal education on CGMs. Twenty-five residents (76%) stated they are not confident or only somewhat confident interpreting CGM reports. For the knowledge-based questions on the pre-survey, the median percentage of correct answers was 70%. Responses to the post-education surveys are still being collected. Results and conclusions will be presented at the Great Lakes Residency Conference.
Learning Objectives:

Discuss challenges associated with CGM implementation
Recognize considerations for use with continuous glucose monitoring (CGM)

Self Assessment Questions:

Which of the following is not a barrier to CGM use?

A. Data overload
B. Education on interpretation
C. Cost
D. Improved hypoglycemia awareness

CGMs have been shown to improve all of the following EXCEPT:

A. Decrease mortality
B. Hypoglycemia awareness
C. Time in blood glucose range
D. Decrease A1c

Q1 Answer: D Q2 Answer: A

Evaluation of Early Clinical Improvement with Tenecteplase versus Alteplase before Mechanical Thrombectomy in Acute Ischemic Stroke

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Background:

Historically, alteplase has been used as the preferred thrombolytic for treatment for acute ischemic stroke. Tenecteplase varies from alteplase by three point mutations allowing for differing pharmacokinetic parameters and potentially increased incidence of early recanalization prior to mechanical thrombectomy (MT). In recent years, literature has emerged demonstrating tenecteplase as an alternative to alteplase. On June 7th, 2021, University Hospitals Cleveland Medical Center transitioned from alteplase to tenecteplase as the thrombolytic of choice for all adult patients presenting with an acute ischemic stroke. The purpose of this study is to evaluate the rate of early recanalization prior to MT in patients who received tenecteplase as compared with alteplase.

Methods:

This was a retrospective chart review of patients admitted to or transferred to University Hospitals Cleveland Medical Center from December 7th, 2021 to December 7th, 2022. Patients aged 18 to 89 were included if they were administered either alteplase or tenecteplase for acute ischemic stroke, had a confirmed large vessel occlusion on computed tomography angiography, and underwent evaluation for MT. Patients were excluded if enrolled in another clinical trial involving MT or deemed ineligible for MT by the treating physician for reasons other than achievement of early clinical improvement by thrombolytic administration. The primary outcome was the rate of evidence suggestive of early recanalization prior to MT defined as either early clinical improvement (National Institute of Health Stroke Scale [NIHSS] <6) at time of MT evaluation or absence of retrievable thrombus at time of MT. Secondary outcomes included NIHSS improvement, Modified Rankin score at follow-up, time from hospital arrival to thrombolytic administration, hospital length of stay, and 30 day mortality. Safety outcomes included rates of bleeding and angioedema.

Results and conclusions will be presented at The Great Lakes Pharmacy Residency Conference

Learning Objectives:

Describe the pharmacokinetic differences of alteplase compared with tenecteplase
Outline the current literature involving altepalse vs tenecteplase in acute ischemic stroke

Self Assessment Questions:

Which of the following describes the difference in pharmacokinetic/pharmacodynamic parameters of tenecteplase as compared with alteplase?

A. Tenecteplase has decreased resistance to Plasminogen Activator Inhibitor-1 (PAI-1)
B. Alteplase has higher fibrin specificity for clot bound fibrin
C. Tenecteplase has a longer half-life than alteplase
D. Tenecteplase undergoes more rapid proteolytic degradation

The 2019 AHA/ASA Guidelines for the Early Management of Patients with Acute Ischemic Stroke recommends tenecteplase as an alternative to alteplase in which setting?

A. For all patients eligible for IV thrombolytic therapy
B. For patients at a higher risk of bleeding
C. The 2019 guidelines do not mention tenecteplase as a treatment option for acute ischemic stroke
D. As a reasonable alternative to alteplase for patients eligible for mechanical thrombectomy

Q1 Answer: C Q2 Answer: D

Identification of risk factors for Pseudomonas aeruginosa in patients with community-acquired pneumonia

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Background: Community-acquired pneumonia (CAP) is a leading infectious cause of hospitalization, morbidity, and mortality worldwide. As the etiology of CAP continues to evolve, antibiotic-resistant bacteria are becoming more prevalent in the community setting. Among these pathogens is Pseudomonas aeruginosa, a Gram-negative bacteria that is resistant to guideline-recommended antibiotic therapies for CAP. Although incidence of CAP due to P. aeruginosa is low, it has been linked to severe illness and poor clinical outcomes, highlighting the challenge in treating this infection. The Infectious Diseases Society of America (IDSA)/American Thoracic Society (ATS) CAP guidelines recommend the development of locally validated risk factors for clinicians to reference when deciding to cover empirically for P. aeruginosa in CAP. Identifying local risk factors for pneumonia due to drug-resistant pathogens, specifically Pseudomonas, can potentially reduce the overuse of unnecessary empiric broad-spectrum antipseudomonal agents and increase appropriateness of empiric antibiotic treatment regimens.
Purpose: The purpose of this study was to identify risk factors for Pseudomonas aeruginosa in patients with community-acquired pneumonia at Loyola University Medical Center.
Methods: A single-center, retrospective cohort study was conducted in patients who were treated for CAP at Loyola University Medical Center from September 1, 2019 through August 31, 2022. The primary endpoint was to identify risk factors for P. aeruginosa in patients with CAP at our institution. The data was collected using REDCap. Baseline characteristics were analyzed using mean and standard deviation for parametric data. Categorical data was analyzed via Chi-squared test or Fisherâ€™s exact test, as appropriate. Continuous parametric data was analyzed using the unpaired t-test and continuous non-parametric data was analyzed by the Mann-Whitney U test. The primary endpoint was assessed via multivariate logistic regression analysis.
Results: Results and conclusions will be presented at the 2023 Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Recognize clinical signs and symptoms of pneumonia
Identify risk factors for Pseudomonas aeruginosa in community acquired pneumonia

Self Assessment Questions:

have a Tmax 38.3Â°C, BP 137/79 mmHg, RR 20, WBC 13.3, and SpO2 92% on RA. Chest x-ray shows right lower lobe infiltrates concerning for an infectious process. Past medical history is significant for COPD, HTN, GERD, and pneumococcal pneumonia eight months prior treated in the outpatient setting. Of note, she had a recent hospitalization for a COPD exacerbation, which led to a four-day hospital stay and receipt of oral azithromycin. In combination with the radiographic evidence of an infectious process and elevated WBC, which of the following is concerning for pneumonia?

A. Fever of 38.3Â°C
B. Elevated BP of 137/79
C. Room air SpO2 92%
D. RR 20

Which risk factor(s) does this patient have that puts her at a higher risk of having Pseudomonas aeruginosa pneumonia?

A. Receipt of antibiotics during recent hospitalization
B. Recent hospitalization for COPD exacerbation
C. History of pneumococcal pneumonia
D. A and B

Q1 Answer: A Q2 Answer: B

No Time to Wait: Hepatitis B Vaccine Compliance in Neonates

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patientâ€™s overall immunity and timing of future vaccinations. The purpose of this study is to assess the efficacy of a hepatitis B adherence quality improvement project initiated in the 59-bed Brandon Neonatal Intensive Care Unit (NICU) at C.S. Mott Childrenâ€™s Hospital within the Michigan Medicine academic medical center in Ann Arbor, MI. The project is aimed to address on-time administration of first-dose hepatitis B vaccination, per the Center for Disease Controlâ€™s Advisory Committee on Immunization Practicesâ€™ (ACIP) guideline recommendations, in neonates weighing less than 2000 grams at birth.

Methods: This single-center, retrospective chart review will evaluate the administration of first-dose hepatitis B vaccine in all inborn neonates admitted to the Brandon NICU. Neonates admitted to the NICU from the emergency department or transferred from an outside hospital will be excluded from the study. Patient admission information will be extracted from MiChart, the University of Michigan Healthâ€™s electronic health record prior to and post the implementation of the hepatitis B adherence project, from July 1, 2022 to September 30, 2022 and November 1, 2022 to January 31, 2023. On-time administration of first-dose hepatitis B vaccination, per ACIP first dose guideline, will be assessed pre- and post-project initiation as the primary endpoint.

Results and Conclusions: Data analysis is ongoing. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Explain the incidence of hepatitis B and the importance of on-time vaccine administration in neonates

Review current hepatitis B vaccination schedule recommendations for infants weighing less than 2000 grams at birth

Self Assessment Questions:

At birth, vaccine response is _____ in preterm infants weighing less than 2000 grams, compared to infants with birth weights over 2000 grams.

A. Increased

B. Decreased

C. Comparable

D. Undetectable

neonatal patients born to hepatitis B antigen-negative mothers weighing less than 2000 grams should receive their first dose of the hepatitis B vaccine:

A. Within the first 24 hours of birth

B. At one month of age or hospital discharge, if hospital discharge occurs earlier

C. At two months of age

D. When their weight is above 2000 grams

Q1 Answer: B Q2 Answer: B

The Effect of a Standard Electrolyte Protocol on Patients with Low Body Weight in the Emergency Department

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Purpose: Electrolyte disturbances and deficiencies are common among critically ill patients. There is no literature assessing outcomes associated with electrolyte protocols specifically in the emergency department. Additionally, there is no literature available assessing outcomes associated with standard electrolyte protocols and replacement strategies in underweight patients. Body composition varies based on body weight and could play a role in how low body weight individuals may respond differently to standard electrolyte replacement. It is possible that a non-weight-based replacement protocol may lead to unsafe overcorrection. This study aims to explore gaps in literature by assessing potassium replacement in patients weighing 45 kg or less in the emergency department at Michigan Medicine. This study will assess whether underweight patients are at an increased risk of potassium overcorrection and increased risk of adverse effects. The results of this study will be utilized to assess the need for an electrolyte replacement protocol specific to underweight patients in the emergency department.

Methods: This is a single center, retrospective chart review assessing patients who received a standard electrolyte replacement protocol in the emergency department. The study arm includes patients weighing < 45 kg, who received at minimum one dose of potassium for replacement only, between July 2015 to July 2022. The control arm includes patients weighing > 45 kg who are paired in a 3:1 ratio for every 1 patient included in the study arm. The primary endpoint of this study is the relative risk of potassium overcorrection in patients weighing < 45 kg compared to > 45 kg. Secondary endpoints will assess potassium serum change per unit of potassium and the prevalence of overcorrection in the following weight categories: < 35 kg, 35-45 kg, and > 45 kg.

Results: Results will be presented at the 2023 Great Lakes Pharmacy Residency Conference

Learning Objectives:

Discuss difficulties of repleting patients of lower body weight with standard electrolyte protocols

Identify which patient weight group requires weight-based electrolyte replacement

Self Assessment Questions:

What is NOT a risk or side effect associated with potassium over-correction?

A. Polyuria

B. Muscle cramps
C. Anuria
D. Peaked T waves on an EKG

At what weight should we designate patients as â€œlow body weightâ€ and be more concerned with their dosing?
A. < 50 kg
B. < 45 kg
C. < 35 kg
D. Unknown

Q1 Answer: A Q2 Answer: D

Timing of Hydrocortisone Discontinuation in Patients with Septic Shock

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Background: Corticosteroids have been found to be beneficial in patients with septic shock. Annane et al. found a significant mortality benefit with the addition of fludrocortisone and hydrocortisone and the CORTICUS trial found a reduction in time to reversal of shock. Therefore, the 2021 Surviving Sepsis Campaign recommends the addition of intravenous (IV) hydrocortisone 50 mg every 6 hours to norepinephrine or epinephrine when the doses are â‰¥0.25 mcg/kg/min for at least 4 hours after initiation. However, the timing of discontinuing corticosteroids is controversial.

Statement of purpose: The purpose of this study is to determine if discontinuing hydrocortisone at the time of vasopressor discontinuation is non-inferior to a total of 7 days of hydrocortisone in terms of failure to reverse shock.

Statement of methods: This will be a single center retrospective chart review performed at UI Health. 290 patients are planned to be evaluated. that discontinuing hydrocortisone at the time of vasopressor discontinuation will be non-inferior to 7 days of hydrocortisone in failure to reverse shock. The primary end point is failure of reversal of shock, defined as reinitiation of vasopressors after 6 hours of hydrocortisone discontinuation. Secondary efficacy endpoints include ICU length of stay, hospital length of stay, ICU mortality, shock free days, and ventilator free days. The secondary safety endpoints include days with delirium (defined as at least one positive Confusion Assessment method for the ICU [CAM-ICU] score), super infection (defined as a new infection occurring 48 hours or more after initiation of hydrocortisone), highest daily white blood cell count, positive blood cultures, cumulative daily insulin requirements.

Results/conclusion: Results and conclusions will be presented at the 2023 Great Lakes Pharmacy Resident Conference.

Learning Objectives:
Define when stress dose corticosteroids are indicated in septic shock patients.
Discuss the discontinuation strategies of corticosteroids that are utilized in practice and previous landmark sepsis trials.

Self Assessment Questions:

When are stress dose steroids indicated for the treatment of septic shock per the 2021 Surviving Sepsis Campaign?
A. When norepinephrine, epinephrine, and vasopressin are at their maximum doses
B. When norepinephrine or epinephrine are â‰¥0.25 mcg/kg/min for at least 4 hours after initiation
C. Corticosteroids should be started prior to vasopressor therapy
D. Corticosteroids are not indicated for the treatment of sepsis and therefore should not be initiated

What discontinuation strategies have been utilized in previous trials for corticosteroids in shock?
A. Abrupt discontinuation after 7 days
B. 5 days of full dose followed by a slow taper until day 11
C. Abrupt discontinuation after 3 days
D. All of the above

Q1 Answer: B Q2 Answer: D

Safety evaluation of weight-tiered, anti-Xa guided versus fixed dose enoxaparin prophylaxis in traumatic intracranial hemorrhage: a retrospective study

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management includes consideration for timing of enoxaparin VTE chemoprophylaxis initiation, dosing, and monitoring. Weight-tiered and anti-Xa guided enoxaparin dosing may reduce VTE incidence without increasing transfusion requirements, but current literature is limited in patients with ICH. The purpose of this study was to evaluate the safety and efficacy of weight-tiered, anti-Xa guided versus fixed dosing enoxaparin in trauma patients with ICH.

The study was a single-center, retrospective study of patients admitted to an academic, quaternary, level 1 trauma center between January 2013 and October 2022. Inclusion criteria were adults â‰¥18 years old with acute traumatic ICH admitted to the trauma or neurosurgery services and received â‰¥1 enoxaparin dose within 7 days of admission. Exclusion criteria were length of stay <3 days, death within 3 days of admission, and patients who received enoxaparin dosed every 8 hours. The study groups were patients who received enoxaparin VTE prophylaxis per institutional team-based protocols for weight-tiered, anti-Xa guided dosing versus a standard of care, fixed dose of 30 mg every 12 hours.
The primary endpoint was expansion of ICH defined any new or enlargement of ICH on computed tomography (CT) or need for operative intervention for ICH. The primary endpoint was evaluated up to 14 days from initiation of VTE chemoprophylaxis. Secondary endpoints included VTE incidence and in-hospital mortality. Secondary endpoints will be evaluated through day 30 or hospital discharge. Data and outcome were compared using Chi-square or Fisherâ€™s exact test for categorical data and Studentâ€™s t-test or Wilcoxon Rank Sum for continuous data, as appropriate. A multivariate logistic regression will be used to identify risk factors for ICH expansion.

Data analysis is ongoing. Results will be presented at the Great Lakes Pharmacy Resident Conference.
Learning Objectives:
Recognize the importance of timing of venous thromboembolism prophylaxis initiation in trauma patients presenting with intracranial hemorrhage.
Describe available strategies to monitor the dosing of enoxaparin prophylaxis in trauma patients.
Self Assessment Questions:
A patient presents to the emergency department on 2/12/2021 following a motorcycle accident. The initial head computed-tomography (CT) demonstrated a sub-arachnoid hemorrhage (SAH). The serial head CTâ€™s demonstrate stability of the SAH on 2/13/2021 at 0830. According to the Western Trauma Association, when should venous thromboembolism (VTE) prophylaxis be started, if the patient has no other contraindications to prophylaxis?
A. Start VTE prophylaxis 6 hours after the stable head CT on 2/13/2021 at 1430.
B. Start VTE prophylaxis 12 hours after the stable head CT on 2/13/2021 at 2030.
C. Start VTE prophylaxis 24 hours after the stable head CT on 2/14/2021 at 0830.
D. Start VTE prophylaxis 48 hours after the stable head CT on 2/15/2021 at 0830.
Which of the below correctly drawn anti-Xa troughs would be considered at goal for a trauma patient receiving prophylactic enoxaparin?
A. <0.10 IU/mL
B. 0.16 IU/mL
C. 0.42 IU/mL
D. 0.83 IU/mL
Q1 Answer: C Q2 Answer: B

Outcomes after Hydroxocobalamin Administration in Inhalation Injury and the Incidence of Nephrotoxicity
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and cyanide poisoning are often seen in burn patients but may also present without thermal injury. If cyanide toxicity is confirmed or suspected, the antidote, hydroxocobalamin is indicated. Although lifesaving, hydroxocobalamin has demonstrated possible association with nephrotoxicity. It remains unclear whether the outcomes observed after hydroxocobalamin administration are influenced by other confounding variables associated with this condition.
Purpose: The objective of this study is to describe nephrotoxicity in our ICU population with IHI who receive hydroxocobalamin and assess whether there is a difference in incidence or severity of nephrotoxicity depending on thermal injury, percent total body surface area (TBSA) affected, age, or fluid resuscitation.
Methods: This retrospective, matched, cohort study was conducted at a 315-bed safety net hospital. The study institution is a Level I Trauma Center and ABA-verified Regional Burn Center. Patients were included if they were admitted to the Medical ICU or Burn ICU for at least 48 hours between October 2016 and December 2022, had a diagnosis of IHI, and received at least one dose of hydroxocobalamin at the study institution. Data were collected from the electronic medical record including TBSA, use of Parkland formula-guided resuscitation, total volume of fluids administered, initiation of renal replacement therapy, and administration of nephrotoxic medications. The primary outcome was the incidence of acute kidney injury within 72 hours of admission, defined using KDIGO criteria.
Results: Data collection is ongoing. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.
Learning Objectives:
Describe the mechanism of action of hydroxocobalamin and how it functions as an antidote for cyanide toxicity

Identify the potential clinical consequences of inhalation injury and hydroxocobalamin administration

Self Assessment Questions:

A recent house fire victim presented to the emergency department with a GCS of 6 and hypotension despite persistent fluid resuscitation. Your team has suspicion for cyanide toxicity and administers hydroxocobalamin 5g IV over 15 min. Which of the following do you expect your patient to excrete?

A. Ascorbic acid
B. Vitamin B12
C. Vitamin B6
D. Folate

Which of the following are commonly seen with inhalation injury?

A. Increased need for mechanical ventilation
B. Decreased fluid requirements
C. Increased risk of mortality
D. Both A and C

Q1 Answer: B Q2 Answer: D

Effects of Staffing Levels on Medication Safety Incidents and Metrics

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Background

Medication errors are a major cause of death in the United States. Evidence suggests that burnout and fatigue brought on by staffing shortages can increase the risk of medication errors. With a technician staffing shortage, our technicians are faced with a higher workload which puts them at risk of making a medication error in the medication preparation and delivery processes. The goal of this project is to assess the relationship between pharmacy related risk reports, medication safety process, and pharmacy staffing levels.

Methods

This was a retrospective, multi-center, observational study at University of Michigan Health. Data was collected from February 2020 through September 2022. Information on staffing levels was obtained from the Humanity scheduling application for pharmacy technicians. Staffing data from Humanity collected included the number of open shifts, minimum safe staffing level, and staffing area. Medication errors are reported in a voluntary risk report. Risk report data was extracted from RL Datix software on medication error classification. Medication preparation accuracy data is recorded in the application â€œDispense Prepâ€ from the electronic medical record. Compliance to this software was reviewed as a measure of medication safety compliance. A relational database was created linking all three applications to evaluate trends.

Results

Data from the risk reporting software showed that the top reported reasons for medications errors were dose given late (38.47%), wrong dose/volume (11.05%), dose not given (9.36%), damaged/unusable/expired/recalled (8.77%), and wrong medication (7.44%). There was no trend between medication error risk reporting with increased pharmacy technician shortages. Data collection will be ongoing for this project.

Discussion

Our relational database did not identify trends between risk reporting and staffing shortages. Risk reporting is voluntary and therefore does not capture an accurate picture of medication error frequency.

Learning Objectives:

Describe the current state of relationship between healthcare staffing levels and safety outcomes
Identify patterns of pharmacy staffing and medication safety metrics

Self Assessment Questions:

Where do medication error deaths rank overall compared to other reported causes of death in the United states

A. 1st
B. 3rd
C. 10th
D. 15th

What could data on medication safety and staffing shortages provide?

A. Improved staffing model decisions
B. Greater staff satisfaction and retention
C. Cost reduction through risk aversion
D. All of the above

Q1 Answer: B Q2 Answer: D

Impact of baseline procalcitonin ordering in the ED on antimicrobial discontinuation in patients with sepsis at a rural community health system

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Purpose:
CMS core measures require that antimicrobial agents be initiated for patients with definite or probable sepsis; however, this requirement may lead to the initiation of antimicrobial agents for patients with no infectious condition. The Surviving Sepsis Campaign (SSC) guideline for management of sepsis 2021 update suggests using procalcitonin and clinical evaluation to decide when to discontinue antimicrobials over clinical evaluation alone. The purpose of this study is to assess the impact of ordering baseline procalcitonin levels on antimicrobial discontinuation in hospitalized sepsis patients presenting from the ED.

Methods:
Before data collection began, this study was submitted to the Institutional Review Board for approval. Reports were generated of all patients discharged from a three-hospital health system with a diagnosis of severe sepsis or septic shock from January 1, 2021 through December 31, 2021. Included patients were divided into two groups: patients without a procalcitonin level collected within the first 6 hours of hospital presentation and patients with a procalcitonin level collected within the first 6 hours of hospital presentation. Patient eligibility for inclusion was confirmed through individual chart review of the patientâ€™s Electronic Medical Record (EMR). Data collected included age, sex, admission and discharge dates, antimicrobials initiated, antimicrobial duration, and procalcitonin collection times with their respective values. The primary outcome was the antibiotic treatment duration of hospitalized patients with sepsis. Secondary outcomes included the number of days from two negative procalcitonin levels 48 hours apart to antibiotic discontinuation and duration of discharge antibiotic therapy.

Data is currently being collected and analyzed, results will be presented at the conference.

Learning Objectives:
Review standards of care for the antimicrobial management of sepsis and septic shock
Discuss the role of procalcitonin in promoting antimicrobial stewardship

Self Assessment Questions:
Which of the following is recommended by the Surviving Sepsis Campaign 2021 guidelines for antimicrobial management of sepsis?
A. Broad spectrum antimicrobials should be initiated within 1 hour of sepsis recognition
B. MRSA should be covered empirically in all sepsis patients
C. Procalcitonin monitoring should be utilized over clinical evaluation for antimicrobial discontinuation
D. Oral antimicrobial agents may be started initially for low-severity sepsis patients
Which of the following is true regarding procalcitonin?
A. Procalcitonin typically remains elevated long after infection clearance
B. Both sepsis and shock without sepsis may elevate procalcitonin
C. Procalcitonin is an infection-specific biomarker
D. Procalcitonin is widely used as a diagnostic tool for sepsis
Q1 Answer: A Q2 Answer: B

Retrospective Evaluation of Paclitaxel Hypersensitivity Reactions to Guide Future Management of Patients Taking Paclitaxel

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MyMichigan Health systems. This broad usage has led to an increase in incidence of adverse reactions and hypersensitivity reactions. Hypersensitivity reactions specifically occur more often with paclitaxel than docetaxel in both clinical trials and in practice. The investigatorsâ€™ objective of this study is to help providers identify higher risk patients and prescribe appropriate pre-medications to reduce potential hypersensitivity reactions. Methods: Investigators will conduct a retrospective evaluation of 128 MyMichigan Health patients who have been treated with a paclitaxel containing chemotherapeutic regimen in the past 6 months. In patients identified the incidence of a hypersensitivity reaction occurring and the severity of the reaction will be determined based on documented nursing administration notes. After evaluating the presence and severity of a hypersensitivity reaction, the investigator will collect patient specific factors such as age, gender, comorbid disease states, and previous allergies that may have contributed to the incidence of these reactions. Treatment specific factors that will be collected and considered includes the patientâ€™s cancer diagnosis, the paclitaxel dosing interval, drug manufacturer, the use of premedication, incidence of rescue medication use and the doses used, and when the hypersensitivity reaction occurred during treatment. The outcomes of this study will help to guide our physician protocol selection and assist them with more aggressive premedication regimens for identified patient groups. By identifying higher risk patients, investigators will potentially aid in categorizing other patients whose premedication regimen could be adjusted. This in turn will provide better patient outcomes and increase the number of patients able to continue with currently prescribed treatments. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Define the different types of hypersensitivity reactions

Recall the appropriate pre-medication regimen utilized prior to Taxol administration

Self Assessment Questions:

1) Which type of hypersensitivity reaction is IgE mediated and has an onset of <1 hour?

A. Type I

B. Type II

C. Type III

D. Type IV

2) Which of these medications is included in the NCCN recommendations for pre-medications prior to Taxol administration?

A. Phenergan (promethazine)

B. Tylenol (acetaminophen)

C. Pepcid (famotidine)

D. Emend (aprepitant)

Q1 Answer: A Q2 Answer: C

Ex out Dex: Reduction in Pre-medications Prior to Paclitaxel Chemotherapy

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Purpose: Paclitaxel is a cornerstone of therapy in many solid tumor regimens. Cremophor, the diluent used in paclitaxel, increases risk for a hypersensitivity reaction (HSR) requiring the use of a premedication strategy including corticosteroids, histamine-1 and histamine-2 blockers. The purpose of this project is to modify our current premedication regimen to provide improved management of paclitaxel associated hypersensitivity reactions through elimination or reduction of premedication.

Methods: Patients receiving weekly paclitaxel as part of a breast, gynecological, gastrointestinal and lung cancer regimen were retrospectively reviewed in a pre-intervention group with a planned post-intervention group cohort. The pre-intervention group included patients starting weekly paclitaxel between 1/1/22-12/31/22. Patients receiving paclitaxel in a research protocol were excluded. Data collected from medical records included demographics, paclitaxel doses, blood glucoses and weights for six treatments of paclitaxel. The planned intervention group will consist of patients receiving weekly paclitaxel with a reduced premedication dosing strategy for patients who did not experience a hypersensitivity reaction in the first three paclitaxel treatments. This reduced strategy includes eliminating dexamethasone and reducing diphenhydramine after paclitaxel treatment 3. The primary endpoint estimates the incidence of rescue medication use during doses 4 to 6. All reactions will be reported.

Results: Data is currently being collected for the pre-intervention group. Beacon functionality is being built to allow seamless reduction in premedication. All available results will be presented at the conference. Anticipated results in the intervention group include decreased utilization of dexamethasone, improved patient tolerance without use of dexamethasone and reduced dose of diphenhydramine and no change in frequency of hypersensitivity reactions.

Learning Objectives:

Describe the increased risk of hypersensitivity reactions with paclitaxel.

Discuss the side effects of different paclitaxel premedication dosing strategies.

Self Assessment Questions:

Patients have the highest risk for a hypersensitivity reaction with paclitaxel during what treatments?

A. Treatment 1-2

B. Treatment 2-3

C. Treatment 3-4
D. Treatment 4+
2. Which of the following would not be an expected side effect of dexamethasone?
A. Blood glucose elevation
B. Fever
C. Weight gain
D. Insomnia
Q1 Answer: A Q2 Answer: B

Peer Review Amongst Ambulatory Care Pharmacists

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Statement of Purpose: The purpose of this study is to assess Ambulatory Care Pharmacistsâ€™ perception of peer feedback. Currently, there is limited data that has assessed the perceptions of peer-feedback within a pharmacy setting. Peer feedback has been shown to be beneficial for quality control, standardization and to promote collaboration amongst ambulatory care pharmacists. Among our ambulatory care team, a peer feedback process was implemented for diabetes and anticoagulation services. The pharmacists received surveys before and after implementation of the peer evaluation process.

Primary Objective: Pharmacists' perception of receiving feedback from their peers using a survey.

Secondary Objectives: The changes in scoring on individual questions between the pre- and post-implementation.

Statement of Methods Used: An anonymous pre-survey was sent to the ambulatory care pharmacists to gauge their perception of peer feedback in October 2022. The peer feedback process was implemented shortly after the survey results were received. The pharmacists were randomly assigned to review their peersâ€™ documentation for diabetes and anticoagulation encounters. The anonymous feedback was distributed to the pharmacists who were reviewed. After the feedback was given, the pharmacists received a post- survey on their perceptions of the peer feedback process. The changes in scoring in the questionnaire will be assessed in aggregate for the pre- and post-implementation surveys. Data will be analyzed using a Wilcoxon matched-pairs signed-rank test to compare the differences in perceptions of peer feedback.

Results and Conclusion: Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recall the benefits of peer feedback in an ambulatory care setting.
Discuss pharmacistsâ€™ perceptions of the peer feedback process in an ambulatory care setting.

Self Assessment Questions:

Which of the following is a benefit to peer feedback?
A. Standardized documentation
B. Pharmacist collaboration
C. Better reimbursement
D. A&B
After peer feedback was implemented, more pharmacists felt that peer feedback was valuable and provided unique information.
A. TRUE
B. FALSE
C. N/A
D. N/A
Q1 Answer: D Q2 Answer: B

Glycemic Control in Critically Ill Adult Patients With Versus Without Regular Insulin Added to Parenteral Nutrition

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Parenteral nutrition (PN) is common in critically ill patients. This can cause hyperglycemia and glucose variability, leading to an increased risk of infection and mortality. While regular insulin in parenteral nutrition (RI-in-PN) is an established modality for glucose control in non-critically ill patients, more data is needed on its use in critically ill patients. The primary objective of this study is to determine the utility of using regular insulin in parental nutrition as a modality to achieve blood glucose control in critically ill patients.

This is a single-center retrospective chart review of critically ill adult patients receiving PN in surgical intensive care unit (ICU) settings. Sixty patients were randomly selected to form 3 groups. One group used RI-in-PN (Cardiovascular ICU (CVICU) patients), and two did not (a CVICU and Surgical ICU (SICU) group). The primary outcome is rates of hypoglycemia (< 70 mg/dL and <54 mg/dL) and hyperglycemia (>180 mg/dL and >250 mg/dL). Secondary outcomes include time in the blood glucose range of 70-180 mg/dL, coefficient of variation as a marker of glucose variability, use of other insulin modalities, ICU length of stay, infection, and mortality rates.

Preliminary data shows that 4 hypoglycemic events occurred in the RI-in-PN group, with 9 and 14 events in the non-RI-in-PN CVICU and SICU groups, respectively. The time in the blood glucose range of 70-180 mg/dL was 77.1% in the RI-in-PN, and 87.3% and 74.3% in the non-RI-in-PN CVICU and SICU groups, respectively. And none of the PNs in the RI-in-PN groups were stopped for hypoglycemia. This early data analysis shows that RI-in-PN is a safe option for surgical ICU patients.

The finalized results of this study will aid in generating early-stage, observational data for a future possible interventional study evaluating appropriate modalities for controlling blood glucose in critically ill patients receiving PN.

Learning Objectives:
Recall available data for the use of regular insulin in parenteral nutrition.
Describe a retrospective study evaluating the use of regular insulin in parenteral nutrition in critically ill patients.
Self Assessment Questions:
Which of the following is a concern that providers have regarding the use of regular insulin in parenteral nutrition (PN)?
A. It allows for the calculated co-administration of insulin alongside carbohydrates.
B. It may lead to hypoglycemia if improperly titrated.
C. It may lead to abrupt discontinuation of PN, leaving the patient without nutrition for a portion of the day.
D. B and C
What does the currently available data suggest about the use of regular insulin in parenteral nutrition (PN)?
A. The current data suggest that it is better for glucose control compared to other modalities in all patient populations.
B. The current data suggest that it provides similar levels of glucose control compared to other modalities in all patient populations.
C. The current data suggest that it provides similar levels of glucose control compared to other modalities in post-operative populations.
D. The current data suggests that it is safe and effective for blood glucose control in critically ill patients.
Q1 Answer: D Q2 Answer: C

Assessing antibiotics utilized for secondary spontaneous bacterial peritonitis (SBP) prophylaxis
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1. Background: Ascites is one of the many components of hepatic decompensation. Those with ascites face a higher mortality risk as they are prone to develop additional complications such as spontaneous bacterial peritonitis (SBP). Of patients who develop SBP initially, up to 70% will experience recurrent episodes of SBP; therefore, secondary prophylaxis is recommended in those who have been diagnosed with SBP and have completed therapy for their initial episode. However, selection of antibiotics for secondary prophylaxis continues to be challenging due to changes in antibiotic resistance pathogens and epidemiology. Studies have found that, in patients with cirrhosis, approximately 35% of infections are caused by multidrug resistant organism (MDRO) pathogens such as methicillin-resistant Staphylococcus aureus (MRSA).
2. Statement of Purpose: The purpose of this study is to evaluate current antibiotic prescribing practices for secondary SBP prophylaxis and to characterize the types of causative pathogens and resistance patterns seen at Froedtert Hospital (FH).
3. Methods: The study will be divided into phase I and phase II, where phase I involves gathering data pre-guideline implementation, creating the guideline and phase II involved obtaining data post guideline implementation. This study will focus on phase I. The primary objective of this study is to determine the appropriateness in antibiotic prescribing practices pre guideline implementation at FH. Secondary objectives obtained pre-guideline implementation: classify antibiotics used in the treatment and the secondary prophylaxis of SBP, determine the common causative bacteria and resistance patterns of SBP to help better establish trends of microbiota in this patient population at FH. Lastly, we will look at inpatient and 1-year mortality from initial SBP episode and 90 day readmission rates from initial SBP treatment.
4. Results/Conclusion: Data is currently being collected, and results will be presented at the conference
Learning Objectives:
Recognize the common pathogens attributed to secondary spontaneous bacterial peritonitis at FH.
Identify common antibiotics used for secondary spontaneous bacterial peritonitis prophylaxis at FH.
Self Assessment Questions:

Which of the following pathogens are commonly responsible for the etiology of secondary spontaneous bacterial peritonitis?
A. Escherichia coli
B. Cryptococcus neoformans
C. MRSA
D. A & C
Which of the following is an option for secondary spontaneous bacterial peritonitis prophylaxis?
A. Daptomycin
B. Vancomycin
C. Sulfamethoxazole-Trimethoprim
D. Oxacillin
Q1 Answer: D Q2 Answer: C

To DOAC or Not To DOAC, That is the Question: Comparison of Apixaban to Warfarin for the Treatment of Venous Thromboembolism in Patients with End-Stage Renal Disease on Hemodialysis

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thromboembolism (aVTE). Both the American Society of Hematology (ASH) and CHEST Guidelines recommend DOACs over warfarin for treatment of aVTE in most patients, but warfarin has remained first-line therapy for patients with end-stage renal disease (ESRD) on hemodialysis (HD) due to a lack of randomized clinical trials. Given the clinical conveniences of DOAC therapy and new data suggesting that apixaban may be safe and effective for patients on HD, it has been reported that providers are prescribing apixaban for the treatment of aVTE in these patients. Therefore, the purpose of this study was to characterize and compare the use of apixaban versus warfarin for treatment of aVTE in patients with ESRD on HD at Henry Ford Health (HFH).

Methods: This was a retrospective cohort study that compared adult patients admitted to a HFH hospital with ESRD on HD and were initiated on oral anticoagulation (OAC) with either apixaban or warfarin for the treatment of aVTE. Patients taking OAC prior to the index event and receiving other modalities of dialysis were excluded. The primary outcome was total length of hospital stay (LOS). Secondary outcomes included LOS from OAC initiation to discharge, LOS from OAC initiation to medically stable for discharge, estimated cost of LOS, OAC regimen at discharge, adherence up to 12 weeks post-discharge, and rate of recurrent VTE and/or bleeding within 90 days of the index event. Categorical variables were compared with Chi-square or Fisherâ€™s exact test. Continuous variables were compared with the Studentâ€™s t test or Mann Whitney U as appropriate. Rigid matching and multivariable linear regression were used to address selection bias.

Results and Conclusions: To be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

List the guideline-recommended agents for the treatment of acute VTE in patients with ESRD on HD.
Identify barriers that have prevented the prescribing of DOACs for the treatment of acute VTE in patients with ESRD on HD.

Self Assessment Questions:

Which of the following anticoagulants is recommended by the American Society of Hematology and CHEST guidelines for the treatment of acute VTE in patients with ESRD on HD?
A. Enoxaparin
B. Warfarin
C. Apixaban
D. Rivaroxaban
What is the primary reason DOACs are not guideline recommended for the treatment of acute VTE in patients with ESRD on HD?
A. Lack of effective coagulation laboratory monitoring for DOACs in this population
B. Lack of insurance coverage for DOACs in this population
C. Lack of data demonstrating the safety and efficacy of DOACs in this population
D. Lack of patient adherence to DOACs in this population
Q1 Answer: B Q2 Answer: C

What is the clinical benefit of escalating doses of oral ketamine for management of refractory pain?

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Data defining oral ketamineâ€™s analgesic role as monotherapy or adjunctive with dose explorations have not been identified. Few publications mention the convention oral ketamine has a dose-dependent â€œrespondersâ€ and non-respondersâ€ dosing impact on pain management. The topic of oral ketamine being used for chronic pain often is limited by small sample sizes making adverse effects and efficacy difficult to capture.

This study will address a gap in the published literature by retrospectively investigating the effect of increasing oral ketamine doses on pain management in patients with refractory pain, particularly when escalated to daily cumulative doses greater than 100 mg. This study aims to explore efficacy with a range of different doses and safety outcomes. The primary objective is to determine to what benefit increasing ketamine dose (cumulative daily dose) has on improvement of daily mean pain score 24 hours post dose change. A pain score reduction of 2 or more is considered clinically meaningful. Secondary objectives include, comparison of pain score change between groups 1&2, 2&3, 4&5. Groups of patients are as follows, 1. No ketamine (i.e. prior to ketamine initiation) 2. Total daily ketamine dose < 50 mg/day 3. Total daily ketamine dose 50 mg â€“ 99 mg 4. Total daily ketamine dose 100 mg â€“ 149 mg 5. Total daily ketamine dose â‰¥ 150 mg. Patients were included if â‰¥ 18 years of age and prescribed oral ketamine in addition to scheduled opioids. Patients were excluded if non-verbal or those with any other condition which precludes their communication of pain scores, Patients not on concurrent opioid therapy or Pregnant.
Results and conclusions will be reported at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:
Explain ketamine's role in reducing pain
Discuss escalating ketamine doses on pain scores and opioid requirements
Self Assessment Questions:
Escalating doses of oral ketamine can help differentiate which patient populations?
A. Degree of hypotension
B. Analgesic responders from non-responders
C. Psychologic benefit
D. Sedative effect
Oral ketamine's role in reducing pain is typically reserved for
A. Adjunctively to opioids to reduce refractory pain
B. Replace all opioids to reduce refractory pain
C. To cross taper to new opioids to reduce refractory pain
D. To reduce depression symptoms in refractory pain
Q1 Answer: B Q2 Answer: A

Utilization of an Automated, Probability Based Algorithm to Determine Pharmacogenomic Adverse Drug Outcome Risk in Cancer Patients

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PURPOSE: Clinical pharmacogenomics is the practice of utilizing genetic information to guide optimal drug selection and dosing in order to maximize therapeutic efficacy and minimize toxicity. Prior research shows 40% of cancer patients present with an opportunity for pharmacogenetic intervention based on their actionable genotype, yet there remains a need to identify oncology patient cohorts who are at highest risk of pharmacogenomic interactions. No studies to date have investigated the benefit of a preemptive, automated pharmacogenomic risk assessment tool in the oncology patient population. The purpose of this project is to utilize a validated, automated pharmacogenomic screening algorithm to identify and stratify risk of clinically significant germline pharmacogenetic drug interactions within a cancer patient population.

METHODS: This is a single-center, retrospective, descriptive analysis conducted via chart review of a projected N=2000 cancer patients. Each patientâ€™s comprehensive medication list will be sent to a genetic testing company, InvitaeÂ©, for automated pharmacogenetic risk screening. Participants will be divided into risk cohorts (primary outcome) and descriptively analyzed for commonalities in secondary outcomes. The primary outcome of this study is the reported Pharmacogenomic Interaction Probability (PIP) score. Secondary outcomes include the proportion of high, moderate, and low risk PIP scores by disease state, age, sex, race, and drug as well as the hospital admission rate, number of emergency department visits, and pain-related events among the high, moderate, and low risk PIP cohorts.

RESULTS: In progress.

CONCLUSIONS: In progress. The results of this project may elucidate which cancer patient cohorts are most likely to benefit from pre-emptive pharmacogenetic testing and thus direct future efforts to incorporate preemptive germline pharmacogenomic profiling into the standard of cancer care. In doing so, this project may ultimately help to protect cancer patients from harm, avoid adverse drug effects as well as ineffective drug therapy, and maximize therapeutic drug benefit.

Learning Objectives:
Explain how clinical pharmacogenomics can guide drug selection and dosing
Discuss resources currently available for implementing pharmacogenomics into clinical practice
Self Assessment Questions:
How might a pharmacogenomic drug interaction manifest?
A. Treatment failure
B. Amplified drug toxicity
C. Death
D. All of the above
Which of the following resources may be utilized for identifying and managing pharmacogenomic drug interactions in all patient populations?
A. American Society of Health-System Pharmacists (ASHP) guidelines
B. Genetic Center for Excellency (GCE) guidelines
C. Clinical Pharmacogenetics Implementation Consortium (CPIC) guidelines
D. American Society of Clinical Oncology (ASCO) guidelines
Q1 Answer: D Q2 Answer: C

Gram Stain Campaign: Antibiotic Therapy for MRSA Pneumonia in ICU Patients
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and deprioritize use of Methicillin-resistant Staphylococcus aureus (MRSA) nasal polymerase chain reaction (PCR) in ICU patients with presumed pneumonia.

Methods: This retrospective single center study utilized a business intelligence tool to identify ICU patients started on vancomycin with presumed pneumonia at UW Health in Madison, WI. ICU patients with presumed pneumonia and no gram positive growth on initial respiratory sample gram stain met inclusion criteria. The primary outcome was negative predictive value (NPV) of respiratory sample gram stain with respect to MRSA speciation. Secondary outcomes included the NPV of MRSA nares PCR plus NPV of respiratory sample gram stain, difference between the NPV of respiratory sample gram stain alone compared to the NPV of MRSA nares PCR plus respiratory sample gram stain and difference in time between antibiotic initiation, respiratory sample gram stain result, MRSA nares PCR result, and de-escalation of antibiotic therapy.

Preliminary Results: Forty four ICU patients were reviewed; 13 of which met inclusion criteria. The majority of patients were male (61.5%) and classified as hospital acquired pneumonia (HAP, 38.5%). No respiratory cultures to date speciated with MRSA. Average time to specimen collection was 5.03 hours and 1.48 hours for respiratory cultures and MRSA nares PCR, respectively. Time to gram stain initial results of respiratory culture were 3.7 hours and MRSA nares PCR results were 6.31 hours, on average.

Conclusions: NPVs of respiratory sample gram stain and MRSA nares PCR in addition to comprehensive time studies will be analyzed once data collection is complete. Anticipated results include data to support the deprioritization of MRSA nares PCRs in ICU patients with presumed pneumonia when respiratory cultures are obtained.
Learning Objectives:
Identify how hospital and ventilator acquired pneumonia are diagnosed
Describe the utility of respiratory sample gram stains in predicting MRSA respiratory culture results in ICU patients with presumed pneumonia
Self Assessment Questions:
How is the diagnosis of hospital and ventilator acquired pneumonia confirmed?
A. MRSA nares PCR
B. Microbiologic studies of respiratory culture
C. Procalcitonin
D. Clinical and radiographic signs of infection
What role does gram-stain guided antimicrobial de-escalation provide in the setting of ICU patients with pneumonia?
A. Decrease use of unnecessary laboratory resources
B. Increase antimicrobial resistance
C. Predict MRSA colonization
D. Increase health care costs
Q1 Answer: B Q2 Answer: A

Implementation of a Pharmacist Glycemic Stewardship Team in the Hospital Setting
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infections, length of stay, and healthcare costs. The Society of Hospital Medicine (SHM) sets the benchmarks for in-patient glycemic control which are defined as hypoglycemia <70 mg/dL hyperglycemia >299 mg/dL, and readings in range 70 â€“ 179 mg/dL. Trinity Health Oakland (THO) has been trailing behind these benchmarks for diabetes management amongst hospitals nationwide. This study's purpose is to compare the implementation of a pharmacist glycemic stewardship team to the usual care provided to persons with diabetes in the hospital setting as benchmarks are not being met. The primary outcome of this study is the comparison of mean daily blood glucose. Secondary outcomes include length of stay, time until intervention is accepted, number of interventions made, percent of interventions accepted, number of insulin dose adjustments made per patient, and hypoglycemic events metrics.

Methods: This is a single-center, prospective, pre-post study conducted at Trinity Health Oakland. Those with at least two blood glucose readings > 180 mg/dL on the general units were included. The pre-implementation group consists of patients with the current care provided from September to October 2022. The post-implementation group, conducted from December 2022 to January 2023, includes patients identified by the pharmacist that need extensive glycemic management and continued monitoring. The pharmacist will provide recommendations to the resident team for patients included regarding insulin dosing, modifying glycemic medications, and diet changes. Patients who were critically ill, pregnant women, those diagnosed with diabetic ketoacidosis and treated for it, those receiving insulin pump therapy and U-500 insulin, and patients admitted less than 48 hours were excluded.

Results/ Conclusion: Data collection and analysis remain ongoing. Results and conclusion will be presented at the Great Lakes Pharmacy Residency
Learning Objectives:
Define readings in range is and how it affects glycemia management in the hospital setting.
Identify proper hospital management of patient with hyperglycemia
Self Assessment Questions:
What is the reading in range benchmark according to the Society of Hospital Medicine?
A. 70 â€“ 119 mg/dL
B. 70 â€“ 179mg/dL
C. 140 â€“ 179 mg/ dL
D. 54 â€“ 69 mg/dL
What is the preferred treatment of hyperglycemia for most noncritically ill hospitalized patients with adequate oral intake?
A. Basal insulin only
B. Basal insulin and sliding scale insulin
C. Basal Insulin and meal-time insulin
D. Basal insulin, meal-time insulin, and correctional scale insulin
Q1 Answer: B Q2 Answer: D

IV Iron in Heart Failure

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Objective: Iron is an essential micronutrient for a myriad of physiological processes in the body. Iron deficiency is a relatively common comorbidity in patients with heart failure. (HF) Correction of iron deficiency has emerged as a treatment in heart failure, showing alleviation of symptoms, improvement in quality of life, and reduced hospitalizations. Currently, intravenous (IV) iron is the preferred route for treatment of iron deficiency in heart failure patients.
Methods: This is a retrospective cohort study of hospitalized patients with acute heart failure exacerbations being treated with IV iron products from January 2015-Decemer 2022. The primary endpoint is hospital readmissions among patients who received IV iron therapy. Additional endpoints will also assess for dosing and duration of IV iron products. Additionally, will review the utilization of any oral iron products.
Results and Conclusion: To be presented at Great Lakes Pharmacy Resident Conference
Learning Objectives:
Define Iron deficiency anemia in heart failure patients
Review Dosages of intravenous iron utilized in the setting of heart failure
Self Assessment Questions:
Which of the following correctly defines iron deficiency in heart failure patients?
A. Ferritin <150Âµg/L or ferritin of 100-299 Âµg/L with a transferrin saturation <10%
B. Ferritin <100 Âµg/L AND transferring saturation < 20%
C. Ferritin <100 Âµg/L or ferritin of 100-299 Âµg/L with a transferrin saturation <20%
D. Ferritin >50 Âµg/L or ferritin of 100-299 Âµg/L with a transferrin saturation <10%
Which of the following reveals drug and dose of intravenous iron product utilized in clinical trials to date?
A. Ferric carboxymaltose 500-2000 mg in totality based on body weight and hemoglobin
B. Sodium ferric gluconate complex 250 mg x 4 doses

C. Iron dextran 2000mg in one dose
D. Iron sucrose 100mg in one dose
Q1 Answer: C Q2 Answer: A

Indiana Physiciansâ€™ Perspectives on Community Pharmacistsâ€™ Participation in Bidirectional Health Information Exchange

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The purpose of this study is to determine 1) the extent to which physicians caring for mutual patients of Community Pharmacy Enhanced Services Network of Indiana (CPESN IN) pharmacies have access to Indiana Health Information Exchange (IHIE) data and 2) physician perspectives and preferences for information to receive from pharmacies through IHIE. Within CPESN IN, pharmacists provide and document in electronic care plans (eCare plans) numerous clinical services. Physician access and desire for eCare plan data is unknown.

Methods

Pharmacists within CPESN IN, specifically those using PioneerRx dispensing software, were contacted to identify the top 10 physician prescribersâ€™ names, contact information (i.e., address and institution/affiliation) and their specialties. This list of physicians was reviewed by an IHIE team member to identify which physicians had access to one or more IHIE products (i.e., CareWeb and Docs4Docs). Physicians with access to either CareWeb or Docs4Docs were eligible for the survey. The survey consists of a combination of likert, likert-type, ranking, and free text items informed by the Consolidated Framework for Implementation Research Intervention Characteristics Constructs. The survey will be pilot tested prior to dissemination by a physician working closely with our research team. Physicians will be contacted via mail or telephone to complete the survey and offered a $50 gift card for participation.

Preliminary Results

A total of 84 physician names were submitted by 12 CPESN-PioneerRx pharmacists after removing mid-level providers and duplicates (i.e., same name and institution). A total of 83 (99%) have CareWeb or Docs4Docs access and 51 (61%) have access to both. Survey data will be presented at GLPRC.

Conclusions

This research aims to build upon research previously conducted by our team to facilitate bidirectional health information exchange between community pharmacists and physicians in Indiana.

Learning Objectives:

Describe the expected impacts of bidirectional health information exchange between community pharmacies and providers.
Identify the extent to which physicians caring for mutual patients of Community Pharmacy Enhanced Services Network of Indiana (CPESN IN) pharmacies have access to Indiana Health Information Exchange (IHIE) data.

Self Assessment Questions:

Which of the following is expected to be a positive impact of bidirectional health information exchange?
A. Improved pharmacy wait times
B. Improved communication between community pharmacists and other healthcare providers
C. Increased quantity of prescriptions filled within a day
D. Decreased costs of prescriptions
What percentage of physicians in our research sample have access to CareWeb or Docs4Docs?
A. 0.99
B. 0.61
C. 0.83
D. 0.74
Q1 Answer: B Q2 Answer: A

The Impact of Age on Efficacy and Safety of the CALGB 50202 Regimen for Primary CNS Lymphoma

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Purpose: Primary CNS Lymphoma (PCNSL) is a rare form of non-Hodgkin, diffuse large B-cell lymphoma. The median survival time for these patients is about 26 months, even with treatment. However, elderly patients have a lower median survival, which is between 7 and 19 months. Currently, there are no standardized or guideline treatment regimens, but in 2013 the Cancer and Leukemia Group B (CALGB) 50202 study was published. This study introduced a new chemotherapy regimen for treatment for PCNSL utilizing high dose methotrexate, temozolomide, and rituximab as a remission induction therapy. If, after the 4 month induction period, patients are deemed to be in complete remission, they are placed on a consolidation regimen of etoposide and cytarabine. This study has become the basis for treatment of PCNSL patients within Henry Ford Health (HFH). However, since the initial publication of the CALGB 50202 study, there have been no further studies investigating how the efficacy and safety of this treatment protocol compares for younger patients versus elderly patients. This research project aims to identify if there are any differences in safety or efficacy of the CALGB 50202 protocol for patients based on their age at chemotherapy initiation.

Methods: This retrospective chart review will include patients treated with the CALGB 50202 regimen at HFH for PCNSL, with chemotherapy initiation starting between May 1st, 2013, and September 30th, 2021. Patients will then be split into two groups based on their age at treatment initiation: Age <60 years old or age â‰¥60 years old. The primary efficacy outcome is 1-year progression free survival. The major safety outcomes include neurotoxicity, nephrotoxicity, and myelosuppression, assessed with the Common Terminology Criteria for Adverse Events.

Results/Conclusions: Data collection and analysis are currently in process. Results and conclusions will be presented at Great Lakes Pharmacy Conference

Learning Objectives:

Explain the effect that patient age has on efficacy of the CALGB 50202 regimen.

Discuss the adverse events measured to assess the safety of high-dose methotrexate.

Self Assessment Questions:

Which of the following is the formula used to calculate the methotrexate dose used in the CALGB 50202 regimen?

A. 2 g/m^2 * BSA * (CrCl/100)

B. 4 g/m^2 * BSA * (CrCl/100)

C. 6 g/m^2 * BSA * (CrCl/100)

D. 8 g/m^2 * BSA * (CrCl/100)

What is the major adverse event of whole brain radiotherapy that led to the creation of an alternative chemotherapy regimen?

A. Nausea and vomiting

B. Nephrotoxicity

C. Neurotoxicity

D. Myelosuppression

Q1 Answer: D Q2 Answer: C

Clinician Attitudes Toward Referring Patients to Pharmacists for Tobacco Cessation Services

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Purpose: Although progress has been made in recent decades to reduce the prevalence of tobacco use, 47.1 million U.S. adults were still current tobacco users in 2020. There remains a significant need for clinicians to intervene with patients who use tobacco. Research indicates that pharmacists are effective in helping their patients quit, with success rates similar to those achieved by other healthcare providers. However, by virtue of their accessibility, pharmacists are uniquely positioned to provide tobacco cessation counseling and medications at the time when their patients are ready to quit. The objective of the current study was to assess cliniciansâ€™ (physicians, nurse practitioners, dentists, and behavioral health counselors) (a) current referral patterns to pharmacists for tobacco cessation services, (b) intention to refer patients to pharmacists in the future, and (c) perceived barriers and facilitators to referrals. This cross-sectional survey study was conducted within a major healthcare network that provides pharmacy services to underserved populations in the State of Indiana.

Methods: The cross-sectional web-based survey was administered to healthcare providers working within a federally-qualified health center in Indiana beginning February 2023. A member of the healthcare provider network distributed a recruitment e-mail to clinicians describing the study and providing an anonymous link to the survey. To increase the response rate, three reminder emails were sent. Survey items were informed by the Consolidated Framework for Implementation Research and included items to characterize referring practices and perceptions of pharmacist prescribing for tobacco cessation. Clinicians who completed the survey received a $10 Amazon gift card as compensation for their time.

Results/Conclusions: Data collection and analysis are currently in progress and results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Explain the current state of tobacco use, quit rates, and medication usage across populations in the United States.

Describe the pharmacistâ€™s role in tobacco cessation.

Self Assessment Questions:

According to the literature, which of the following populations are more likely to use tobacco products?

A. College graduates

B. Individuals residing in the northeast region of the United States

C. Medicare beneficiaries

D. People with mental health conditions

Which statement is true about the roles of pharmacy in tobacco cessation services?

A. In the community pharmacy setting, only pharmacists can provide brief interventions (Ask, Advise, Refer; AAR)

B. Pharmacists can only screen for potential drug-tobacco smoke interactions in hospital or clinic settings

C. 16 states have protocols to allow pharmacists to prescribe either nicotine replacement therapy and/or medications (varenicline or bupropion) to help patients with quitting

D. Pharmacists can prescribe nicotine replacement therapy in all states

Q1 Answer: D Q2 Answer: C

RETROSPECTIVE PEDIATRIC PRESCRIPTION DISCHARGE REVIEW FROM THE EMERGENCY DEPARTMENT

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According to The Joint Commission, pediatric patients are more prone to medication errors for many reasons including the need to perform pediatric-specific calculations, repackaging and altering the original concentration or volume of a drug. Pediatric patients in emergency departments (ED) that are cared for in a primarily adult hospital are at an increased risk for errors. Many studies have demonstrated the pharmacistâ€™s role in medication reconciliation upon hospital discharge including the pediatric population. Providing pharmacist services at discharge results in a substantial reduction of adverse drug-event related ED visits and hospital readmissions for pediatric patients. However, there is limited evidence evaluating the impact of the emergency medicine (EM) pharmacists on medication review at discharge from the ED in this population.

This was a retrospective, single-center chart review. Patients were included if they were less than 18 years old and discharged with a prescription from the Loyola University Medical Center emergency department. The primary endpoint was the potential number of pharmacist interventions captured. Secondary endpoints include type of intervention and type of prescriber.

Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Review current literature on medication reconciliation of pediatric patients

Recall possible interventions made by emergency department pharmacists for pediatric patients at discharge

Self Assessment Questions:

1. Which of the following are ways in which pediatric patients are more susceptible to medication errors than adults?

A. Renal dose adjustments

B. Incorrect dose

C. Hepatic dose adjustments

D. Drug-drug interaction

2. In what way can an emergency medicine pharmacist decrease the rate of pediatric medication errors?

A. Paper discharge prescription

B. Discharge medication reconciliation

C. Counsel patient and guardians prior to discharge

D. B & C

Q1 Answer: B Q2 Answer: D

The Implementation and Impact of Clinical Pharmacy Services in an Interdisciplinary Internal Medicine Clinic

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Purpose: The Americaâ€™s Health Insurance Plans (AHIP) and the Centers for Medicare and Medicaid Services (CMS) have created a core set of measures to ensure patients receive a high standard of healthcare for chronic disease states. Pharmacists are uniquely positioned to impact patient-related outcomes to improve these measures in the primary care setting. The objective of this study is to determine if pharmacy services within an internal medicine clinic will make an impact on CMS-derived clinical interventions and outcomes, clinic workflow, and clinical staff satisfaction.

Methods: This is a multi-clinic, observational study that will be conducted from March 13, 2023 to April 28, 2023. The study will include adult patients who have â‰¥1 intervention with the clinical pharmacist and are currently receiving medication for diabetes, congestive heart failure, hypertension, chronic obstructive pulmonary disease, asthma, and/or chronic kidney disease or who are identified for smoking cessation intervention. Medications managed by specialty providers outside of the affiliated healthcare system will be excluded from pharmacist intervention. The pharmacist will perform chart reviews for guideline-directed therapy recommendations while also identifying any drug-related barriers to medication access or adherence. Impact will be measured by documented interventions, follow-up encounters with patients, and pre/post-surveys to providers. The quantity of patient encounters along with the number and type of interventions made by the pharmacist will be documented daily via a secure Excel file. Types of interventions that will be extrapolated include patient educations, medication therapy services, medication therapy adjustments, and medication adherence audits. A retrospective analysis will be completed utilizing the electronic medical record and aforementioned data, including survey results and pharmacist interventions.

Results: Preliminary results will be presented at the conference as data is currently being collected.

Learning Objectives:
Define types of integrated pharmacologic interventions upon implementation of clinical pharmacy services in an internal medicine clinic.
Identify the potential impact on varying CMS-derived outcomes using chronic disease state clinical endpoints.
Self Assessment Questions:
What types of integrated pharmacologic interventions can a clinical pharmacist make in an internal medicine clinic?
A. Medication dose optimization
B. Smoking cessation consultations
C. Reduction of polypharmacy
D. All of the above
In the setting of an internal medicine clinic, what impact can a clinical pharmacist make on patient outcomes?
A. Increase in guideline-directed medication therapy
B. Decrease in all-cause mortality
C. Decrease in hospitalizations
D. All of the above
Q1 Answer: D Q2 Answer: D

Assessment of the usage and utility of apixaban and rivaroxaban specific anti-Xa levels

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Background: The Ohio State University Wexner Medical Center (OSUWMC) started utilizing anti-Xa levels for direct-acting oral anticoagulants (DOAC) in November 2020. Anti-Xa levels can qualitatively determine whether a factor Xa inhibitor has activity at a given time, which can guide decision-making for possible interventions. These levels were initially intended to be utilized in two clinical scenarios: (1) to assess whether a patient experiencing bleeding would benefit from reversal of their anticoagulant, or (2) whether it is safe for a patient to get a procedure. Since the availability of this lab at OSUWMC, a review of how the levels are being utilized has yet to be completed.

Methods: Data collection included an assessment of anti-Xa levels from November 2020 through June 2022. A report was generated in EPIC to identify all levels ordered over this period at OSUWMC, and patient chart review was completed to assess numerous data points. Anti-Xa levels were included in the analysis if the level was ordered in an inpatient setting and were excluded if the anti-Xa level was obtained prior to a patient beginning a DOAC or if it was collected in an outpatient encounter. Additional analyses were conducted after initial data collection including indications for ordering anti-Xa levels, reversal data, surgery considerations, turnaround time of levels, and time to resumption of anticoagulation after a resulting anti-Xa level.

Statement of Purpose: To evaluate how anti-Xa level ordering is being used at a large, academic medical center and correlate levels with patient-specific factors. It also aims to identify and assess interventions that were made in response to a given anti-Xa level result.

Conclusion: Previously identified criteria for ordering anti-Xa levels at OSUWMC are not strictly adhered to based on the findings of this analysis. Final results will be presented at the Great Lakes Pharmacy Residency Conference.
Learning Objectives:
Discuss considerations for ordering a DOAC specific anti-Xa level.
Identify scenarios where ordering DOAC specific anti-Xa levels are deemed appropriate.

Self Assessment Questions:

Which of the following is expected to be seen for patients on DOAC therapy?

A. Elevated INR
B. Renal dysfunction
C. Signs of bleeding
D. An undetectable DOAC specific anti-Xa level result

Which clinical scenarios may warrant ordering of a DOAC specific anti-Xa level?

A. To determine if a patient with clinical bleeding may benefit from receiving a reversal agent
B. To adjust a maintenance dose of a DOAC
C. To determine if it is safe for a patient with clinical bleeding to get a procedure
D. A & C

Q1 Answer: A Q2 Answer: D

Utility of Rapid Rituximab Infusion Rate Collaborative Practice Agreement in Ambulatory Oncology

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warning highlighting the risk of infusion reactions, which is highest with the first dose and decreases with subsequent administrations. Given this risk, standard rituximab is infused over 4-6 hours in a clinic setting. Previous literature supports the use of rapid infusion of rituximab over a period of 60-90 minutes as a safe and effective method to reduce infusion times.

A guideline for the use of rapid rituximab infusions at Froedtert & the Medical College of Wisconsin was approved in 2011, by which providers may opt to order a rapid infusion for certain patients that have previously tolerated rituximab at the standard infusion rate. This workflow required facilitation by a physician and coordination between numerous staff members, resulting in delayed transition and low compliance rates. In order to optimize the conversion process of standard rituximab to rapid infusion, a collaborative practice agreement (CPA) was approved at Froedtert Health in 2022, by which oncology pharmacists may write and sign rapid rituximab orders for eligible patients receiving rituximab for the treatment of oncologic and/or benign hematologic conditions. The purpose of this study is to evaluate the impact of the pharmacist-driven rapid rituximab conversion protocol.

Methods: This is a single health center retrospective pre/post analysis of patients initiated on rituximab at Froedtert Health. Patients were included if they received at least one standard and one rapid infusion during the study period. This study excluded patients receiving rituximab for a non-oncologic condition or receipt of rituximab through a clinical trial or study. Data was analyzed over a 10-month period before and after implementation of the CPA.

Results/Conclusions: Final results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe infusion reaction grades as defined by the Common Terminology Criteria for Adverse Events (CTCAE)
Identify patients who are eligible for conversion to rapid rituximab under the Froedtert Health collaborative practice agreement (CPA)

Self Assessment Questions:

Which of the following describes a Grade 2 infusion reaction according to the CTCAE?

A. Life-threatening consequences requiring urgent intervention
B. Prolonged reaction or recurrence of symptoms following initial improvement requiring hospitalization
C. Reaction requiring infusion interruption but responds promptly to symptomatic treatment
D. Mild, transient reaction that does not require infusion interruption

Which of the following would exclude a patient from conversion to rapid rituximab under the Froedtert Health CPA?

A. Absolute lymphocyte count (ALC) < 5000
B. Tolerated the prior infusion with a grade 3 infusion reaction
C. Fewer than 3 months since the previous dose of rituximab was infused
D. All of the above

Q1 Answer: C Q2 Answer: B

Impact of post-discharge anticoagulation on readmissions due to thromboembolism in COVID-19 patients

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Purpose: Patients hospitalized with COVID-19 are often immobilized for a period of time, have severe inflammation, and are at an increased risk of clotting. Coagulation abnormalities may be due to the direct effect of SARS-CoV-2 or indirectly by the cytokine storm, endothelial damage, or a combination of both. To this day, it is still unclear whether anticoagulation at discharge is beneficial or safe in COVID-19 patients. The purpose of this study is to determine if anticoagulation at discharge reduced the risk of readmission within 30 days due to thromboembolism.

Methods: A single-center, retrospective chart review was conducted to evaluate the impact of anticoagulation at discharge in COVID-19 patientâ€™s that were hospitalized. All charts for patients admitted to the hospital with confirmed COVID-19 from November 1, 2021 to January 31, 2022 were reviewed. Patients were excluded if they expired during index hospital admission, had a thromboembolic event during index admission, did not have a confirmed COVID-19 test, were admitted to a different hospital during index admission, or were pregnant. The primary objective was to determine if COVID-19 patients discharged on anticoagulation had a lower 30-day readmission rate due to thromboembolism versus COVID-19 patients discharged without anticoagulation. The secondary objectives were to determine if COVID-19 inpatients discharged on anticoagulation had a lower 30-day readmission rate due to all causes compared to COVID-19 inpatients discharged without anticoagulation and to determine if there was an increased risk of readmissions due to bleed in COVID-19 inpatients who were newly prescribed anticoagulation at discharge compared to COVID-19 inpatients discharged without anticoagulation.

Results and Conclusions: Data collection is currently underway, and results and conclusions will be presented at the conference.

Learning Objectives:

Recall risk factors for thromboembolism in COVID-19 patients.

Identify risks and benefits of providing anticoagulation at discharge to hospitalized patients with COVID-19.

Self Assessment Questions:

1. Which of the following labs may indicate that a patient has a blood clot?
   A. Elevated D-dimer
   B. Elevated C-reactive protein
   C. Elevated white blood cells
   D. Elevated troponin
2. The use of anticoagulation at discharge in COVID-19 patients increases the risk of?
   A. Deep vein thrombosis
   B. Pulmonary embolism
   C. Hemorrhage
   D. Stroke

Q1 Answer: A Q2 Answer: C

Impact of a pharmacist-led transition-of-care intervention on discharge antibiotic prescribing

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Purpose: Antibiotic resistance is among the top public health threats and antibiotic-resistant infections lead to increased health care costs, morbidity and mortality. The majority of antimicrobial stewardship efforts are focused solely inpatient, while a gap in care occurs during the transition from inpatient to outpatient. Reviewing antibiotic prescribing during transitions of care (TOC) provides an ideal moment for antibiotic stewardship efforts during a patientâ€™s treatment course. Inpatient pharmacists can proactively impact antibiotic prescribing before a patient discharges. With this framework, pharmacists can help optimize antibiotic utilization by decreasing total antibiotic exposure and assisting in the correct antibiotic choice, also leading to improvements in healthcare workflow. This study aims to evaluate the impact of incorporating a TOC model involving proactive antibiotic review and intervention on outpatient antibiotic choice, dose and duration of therapy.

Methods: This quasi-experimental study is approved by the institutional review board. The TOC model includes development and incorporation of a new workflow, documentation of interventions, ensuring proper communication and adherence to workflow and follow up. Clinical pharmacists are tasked to identify patients with urinary tract infections (UTIs) and lower respiratory tract infections (LRTIs) currently receiving antibiotics and preparing to discharge. The pharmacist then proactively provides a recommendation to the provider on a guideline-supported antibiotic choice, dose, & duration on discharge. Twelve months of â€œpre-interventionâ€ data collected via retrospective chart review is compared to six months of â€œpost-interventionâ€ data for patients who met inclusion and exclusion criteria. The primary outcome is average duration of antibiotic therapy. Secondary analyses examine total number and type of pharmacist interventions, intervention acceptance rates, appropriateness of therapy length, excess days of therapy, 30-day mortality, 30-day readmission, 30-day adverse drug events, and 30-day recurrence of infection rates. Results will be presented at the 2023 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify opportunities in patient care for implementing antibiotic stewardship efforts

Recall the importance of optimizing antibiotic utilization and decreasing total antibiotic exposure

Self Assessment Questions:

In the US, 1 out of every _ hospitalized adults are prescribed an antibiotic at the time of discharge?
A. 5

B. 25
C. 50
D. 100
What is the benefit from optimizing the use of antibiotics?
A. Effectively treat infections
B. Reduce adverse effects from unnecessary antibiotic use
C. Combat antibiotic resistance
D. All of the above
Q1 Answer: A Q2 Answer: D

An assessment of patient outcomes within a collaborative wound care and infectious disease clinic at a VA medical center

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Purpose: Chronic wounds and their associated infections impose a considerable healthcare burden, affecting nearly 2% of the US population. The prevalence of chronic wounds is expected to grow as the population ages due to an increase in wound precipitating illnesses, such as diabetes, obesity, vascular disease, and neuropathy. The Department of Veterans Affairs reports 25% of veterans have a diabetes diagnosis and are therefore, at increased risk for wound formation. Chronic wound management is often complicated by the overlapping contributing factors that lead to wound development and the factors impeding wound healing. Without proper wound healing, there is an increased risk for pain and infection, which can ultimately impair an individualâ€™s quality of life and lead to amputations. The purpose of this study is to understand wound care management in a Veteran population and to determine opportunities for additional treatment optimization.

Methods: This study is a retrospective electronic chart review of 123 patients seen in a combined wound and infectious disease clinic at Veteran Health Indiana from January 1, 2020 to June, 30 2022. Patients were included if they were enrolled in the combined wound care / infectious disease clinic and were over the age of 18. Patients were excluded if they were followed by a non-VA provider, did not maintain follow-up after the initial visit, or had a limb that was determined to be unsalvageable at the initial visit. The primary outcomes were to assess utilization of antibiotics for wound treatment, change in wound status, and incidence of limb amputations. Secondary outcomes included secondary wound development, surgical interventions made, hospital admissions related to vascular disease, infection reoccurrence, vascular related deaths, and change in HgbA1C.

Results and Conclusions: Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:
Discuss appropriate antibiotic use for chronic wound management.
Identify potential advantages for a combined wound care and infectious disease clinic.
Self Assessment Questions:
Which of the following represents an appropriate approach to managing antibiotics in chronic wound care?
A. Immediately start broad spectrum antibiotics on all patients
B. Delay starting antibiotics until cultures are available in the absence of systemic and physical signs of infection
C. Initiate IV antibiotics in patients with a known history of recurrent wound infections
D. Culture every wound prior to initiating antibiotic
Which of the following represents an advantage of having a combined wound care and infectious disease clinic?
A. Collaboration allows providers to address underlying contributing factors that impede wound healing
B. Patients receive targeted antibiotic therapy
C. The incidence of amputations is reduced
D. All of the above
Q1 Answer: B Q2 Answer: D

Implementing Opportunities Identified in the Institute for Safe Medication Practices Gap Analysis for Safe Use of Automated Dispensing Cabinets at a Community Regional Referral Center

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Purpose: A fatal medication error occurred at a hospital in Tennessee when a patient was given vecuronium instead of midazolam. Following this error, the Institute for Safe Medication Practices (ISMP) released the updated â€œGuidelines for the Safe Use of Automated Dispensing Cabinetsâ€ tool highlighting best practices. Senior leadership requested the completion of a gap analysis using this tool to identify opportunities to improve patient safety and prevent a similar error from occurring. The main objective of this project is to target obtainable changes identified in the ISMP gap analysis and implement them at a community regional referral center.
Methods: A high-level gap analysis was conducted by hospital leadership earlier this year. This project included validating gap analysis results, prioritizing interventions, and implementing best practices. Validation was completed through observation and discussion with key stakeholders to identify current practices. After validation, each gap was prioritized based on the level of impact it would have on current practices in patient care and the amount of work and resources required to implement. Out of scope changes were considered those that require major structural modifications. The selected changes were then implemented to address the identified gaps. During the validation phase, baseline data was collected regarding number of opportunities in and out of scope along with the validation results. Prioritization, number of changes implemented, and time involved were also measured. Medication override and automated dispensing cabinet related medication error reports were utilized as post implementation data. These reports were reviewed on a periodic basis to assess the efficacy of the changes.
Preliminary results/Conclusions: Prioritization and implementation of changes to address the gaps is currently in process. Complete implementation results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:
Describe the core safety processes highlighted in ISMPâ€™s Updated Guidelines for Safe Use of Automated Dispensing Cabinets
Discuss the recommended criteria for limiting the medications available on override
Self Assessment Questions:
Which of the following core safety processes is NOT addressed in ISMPâ€™s Guidelines for Safe Use of Automated Dispensing Cabinets (ADC)?
A. Provide non-profiled ADCs in all patient care areas
B. Develop procedures for accurate ADC withdrawal
C. Implement safe ADC stocking and return processes
D. Select and maintain optimal ADC inventory
According to ISMP, which of the following must be done when a medication is removed on override in order to align with ISMPâ€™s best practices?
A. Documentation of override rationale
B. Review override reports only when an error occurs
C. Require a medication order prior to removing a medication on override
D. A and C
Q1 Answer: A Q2 Answer: D

Impact of a Clinical Pharmacist Initiative on Value-Based Care in a Medicare Advantage Patient Population
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Purpose: In 2011, the Affordable Care Act (ACA) announced quality incentive payments to Medicare Advantage (MA) and Medicare Part D plans that achieve an overall star rating of at least four or higher. Norton Healthcare (NHC) has a value-based agreement with a third party health plan that includes monetary incentives for achieving an aggregate star rating of 3.75 or greater for patients enrolled in a Medicare Advantage prescription drug (MAPD) plan. Nationally, pharmacists have demonstrated improvement in several quality metrics, including adherence to medication regimens. The goal of this project is to evaluate the impact of implementing a novel ambulatory pharmacist workflow designed to improve specified star measures including medication adherence and/or statin measures.
Methods: This process improvement project utilized the PDCA (plan, do, check, and act) methodology. Using the third party payerâ€™s database, patients failing an adherence measure related to their antihyperglycemic, statin, and/or antihypertensive, and patients failing statin measures for diabetes and/or cardiovascular disease were identified. Patients were prioritized by predicted fail date and number of measures failing. Throughout the pilot period from August 2022 to December 2022, approximately eight hours per week were dedicated to outreach attempts made by a PGY2 ambulatory care pharmacy resident and the ambulatory care clinical pharmacist preceptor. The goals of outreach were to identify any gaps in care, resolve medication-related issues, ensure understanding of therapy, and assist in coordinating follow-up care and referrals. Outcomes were evaluated after the pilot period and included measure-specific pass rates at the end of 2022, patient engagement rate, and pharmacist interventions.
Results/Conclusions: Results and conclusions will be presented at the 2023 Great Lakes Pharmacy Resident Conference.
Learning Objectives:
Define potential benefits of value-based agreements
Recognize outcomes pharmacists can impact to improve quality metrics
Self Assessment Questions:

Which of the following is a benefit of value-based agreements?
A. Discourages healthy habits
B. Lowers patient satisfaction
C. Lowers costs
D. Increases medical errors
What outcomes can pharmacists impact to improve quality metrics?
A. 30-day readmission rates
B. Adherence to medication regimens
C. Total medication cost through utilization of more cost-effective therapies
D. All of the above
Q1 Answer: C Q2 Answer: D

Risk Factors Associated with Hemodynamic Changes in Critically Ill Adult Patients Receiving Intravenous Ketamine

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Ketamine is a rapid-acting anesthetic that has been used clinically for decades. Its use has expanded to hemodynamically unstable patients due to its favorable sympathomimetic actions perceived to increase mean arterial pressure. The cardiovascular effects following administration seem prominent in previous studies, but incidence of clinically significant hypotension is not well elucidated. Hypotension with ketamine administration has been described in patients with a relative depletion of endogenous catecholamines. These characteristics have been linked to patients with high shock index (HSI) or sepsis, but other risk factors remain unclear. HSI represents a significant population of critically ill patients that may receive ketamine, but the need for identifying other risk factors in less predictable patients is needed.

This retrospective, single-center, observational cohort study conducted at a regional, academic, quaternary referral, level 1 trauma center enrolled patients admitted to the intensive care unit or emergency department that received intravenous ketamine between 2015 and 2021. Patients eligible for inclusion and data collection were identified through an electronic medical record report. Data collected included shock index with low shock index defined as <0.9 bpm/mmHg and HSI ï‚³0.9 bpm/mmHg, type of IV administration, total dose of ketamine in 24 hours, concomitant use of other potentially causative medications, hemodynamics at baseline and every 4-hour intervals following administration, time to first clinically significant change in hemodynamics in efforts to observe association between shock index. An estimate of 144 patients would be required to provide 80% power and alpha at .05 to show an absolute difference of 20% in hemodynamic effects between groups. Regression analyses will be used to determine risk factors associated with hemodynamic changes.

Data collection and analysis are on-going. Results will be presented at Great Lakes Pharmacy Residents Conference in April 2023.
A conclusion will be forthcoming based on results.

Learning Objectives:

Recall shock pathophysiology and risk factors associated with hemodynamic changes.
Recall ketamine pharmacology and common adverse drug reactions in relation to associated risk factors for hemodynamic changes following IV administration.

Self Assessment Questions:

The mechanism by which ketamine induces an increase in cardiac index is?
A. Increased sympathetic output and decreased intracellular calcium
B. Decreased sympathetic output and increased intracellular calcium
C. Increased sympathetic output and inhibition of catecholamine uptake
D. Decreased sympathetic output and increased reuptake of catecholamines
Which of the following parameters would increase a patientâ€™s risk for experiencing a relative decrease in systolic blood pressure following IV ketamine administration based off limited current literature?
A. Cardiogenic shock
B. High shock index (HSI)
C. Low shock index (LSI)
D. Anaphylactic shock
Q1 Answer: C Q2 Answer: B

Needs Assessment for a Diversity, Equity, Inclusion, and Belonging Course in a Bachelorâ€™s of Sciences in Pharmaceutical Science Program

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Purpose: The University of Michigan College of Pharmacy offers a Bachelor's of Science in Pharmaceutical Sciences (BSPS) degree program. This program is designed to prepare students for graduate or professional programs or to directly enter the workforce. Currently, this program does not have a course specifically focused on diversity, equity, inclusion, and belonging (DEIB). With the current gap in curricula, graduates of this program may have deficiencies in their knowledge of race, ethnicity, gender identity, socio-economic status and how these can have undesirable influences on health outcomes. These deficiencies could potentially contribute to health disparities and institutional racism. Therefore, the objective of this study is to identify knowledge, attitudes, and beliefs of students enrolled in a BSPS program related to DEIB health care. A secondary objective is to use this data to guide curriculum development.
Methods: A 37-item survey was developed by adapting questions from previously validated surveys and pilot tested. Students were asked to answer questions using a 4-point Likert scale with scale anchors 1=strongly agree and 4=strongly agree. Demographic information was collected. The survey was distributed to all students (n=100) enrolled in a BSPS program at a public research university during the month of January 2023. Descriptive statistics will be used to characterize the responses to the survey and identify baseline understanding of topics related to diversity, equity, inclusion, and belonging in BSPS students.
Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Define health disparities, institutional racism, diversity, equity, inclusion, and belonging
Discuss how gaps in curriculum related to diversity, equity, inclusion, and belonging can contribute to health disparities

Self Assessment Questions:

1. The collective failure of an organization to provide an appropriate service to people because of their color, culture, or ethnic origin can be defined
A. Health disparities
B. Institutional racism
C. Bias
D. Discrimination

Which of the following statements is true about belonging, as it relates to diversity, equity, inclusion, and belonging?
A. Belonging ensures individuals have a seat at the table
B. Belonging recognizes and values differences
C. Belonging ensures individuals are comfortable in conversation as their true self
D. Belonging creates fair, individualized support

Q1 Answer: B Q2 Answer: C

Implementation of depression management by ambulatory care pharmacists in the primary care setting

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Purpose: In the United States, depression is one of the most commonly diagnosed mental health disorders. Ambulatory care pharmacists have demonstrated positive effects on general patient health, as well as reduction of depression scores. Pharmacists play a critical role in assisting with medication and dosage selection, identifying and managing drug interactions and adverse effects, and increasing adherence. Management of depression in the ambulatory care setting is often relegated to psychiatric-trained pharmacists or providers. Existing data on depression management by ambulatory care pharmacists trained in primary care is limited and outdated. Additionally, there is limited literature to date outlining the implementation of care by a pharmacist in this specific setting. This study will provide insight into current practices for depression management by primary care pharmacy specialists within an academic health center and how pharmacist interventions may impact functional outcomes of depression, including depression scores and medication effects.
Methods: The institutional review board approved this retrospective analysis. Subjects were included if they had a primary care physician within the health system and were seen by an ambulatory care pharmacist for depression. Subjects were excluded if they were under 18 years old, were pregnant at the time of their visit with a pharmacist, or if they had a diagnosis of bipolar disorder, schizophrenia, schizoaffective disorder, or dementia. The primary outcome was characterization of pharmacist interventions for treatment of depression. Secondary outcomes included change in depressive symptoms, as measured by the patient health questionnaire, characterization of adverse effects correlated with medications for depression, and utilization of pharmacogenomics testing and results.
Results: Preliminary results from data collection include 27 patients seen by a primary care pharmacist for depression management. Of these patients, 20 had one or more interventions completed by the pharmacist.
Conclusion: To be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recognize safe and appropriate antidepressant regimens.
Classify severity of depression based on PHQ-9 scores.

Self Assessment Questions:

Which of the antidepressant regimens would be inappropriate for use in any patient?
A. duloxetine and bupropion

B. sertraline and desvenlafaxine
C. mirtazapine and vortioxetine
D. bupropion and buspirone
Which of the following PHQ-9 scores would indicate MILD depression severity?
A. 14
B. 2
C. 7
D. 23
Q1 Answer: B Q2 Answer: C

Retrospective Institutional Evaluation of the Educational Impact on Treatment of Asymptomatic Bacteriuria in the Emergency Department

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practice guidelines recommend against treating UTIs without the presence of urinary symptoms, known as asymptomatic bacteriuria (ASB). Most recent institutional data from The Michigan Hospital Medicine Safety Consortium (HMS) shows increasing rates of inappropriate ASB treatment and need for reform. The primary objective of this study is to evaluate inappropriate treatment rates of ASB in our institutionâ€™s ED. Based on our findings, our educational initiatives will be evaluated for continued use or improvement to optimize antimicrobial usage and improve antimicrobial stewardship efforts in the ED.

Methods: This retrospective, single-center, quasi-experimental, cohort study aims to evaluate treatment rates of ASB following educational efforts in the ED regarding UTI and ASB treatment. Education completed consisted of multiple presentations regarding current guideline-recommended therapy for UTIs, emails sent to ED providers, and meetings on collaborative practice prescribing agreements. The primary outcome compares ASB treatment rates pre-and post-education through retrospective review of patient charts. Secondary outcomes include appropriateness of treatment following current guideline recommendations, average length of therapy prescribed, time of urinalysis collection, urinalysis WBC count, and costs associated with unnecessary treatment. A sample size for the primary outcome was determined based on previous literature to detect a 15% difference between groups using chi-square analysis with a significance level of 0.05 and 80% power. It was estimated that 130 patients per arm need to be enrolled in the study (n = 260) to detect a significant difference.

Results & Conclusions: Data interpretation is in progress. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify clinical indications when patients should be treated for asymptomatic bacteriuria based on the Infectious Disease Society of Americaâ€™s (IDSA) Asymptomatic Bacteriuria Guideline.
Discuss the potential negative impacts of unnecessary antibiotic use in ASB patients.

Self Assessment Questions:

Which of the following patient factors warrants treatment for asymptomatic bacteriuria, per the IDSA guideline?
A. Pregnancy
B. Altered mental status
C. Age > 65
D. Immunocompromised
Which of the following is a potential negative impact of inappropriate antibiotic use?
A. Resistance
B. C. difficile
C. Longer hospital stays
D. All the above
Q1 Answer: A Q2 Answer: D

Impact of care bundle element compliance on clinical outcomes for pediatric patients with Staphylococcus aureus bacteremia

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Staphylococcus aureus is the leading pathogen for bloodstream infections. Staphylococcus aureus bacteremia (SAB) can cause severe infections which may lead to morbidity and mortality in children. The mortality rate has previously been reported between 2-5%. Although the incidence of SAB in children can vary between geographic locations and by age, it may lead to prolonged hospitalizations and/or intensive care unit admissions. The 2011 Infectious Disease Society of America (IDSA) guideline outlines standards of care for patients with SAB. Recommendations from these guidelines have been validated in numerous studies within the adult population. However, there are no present comprehensive data evaluating compliance with these standards of care in pediatric patients.

The primary objective of this study is the evaluate compliance with all bundle elements and the associated impact on mortality and readmission. Secondary objectives include the following: 1) Describe compliance with meeting all bundle elements and meeting individual elements. 2) Identify compliance with all bundle elements and impact on time to blood culture clearance, length of stay, time to afebrile, and need for antibiotic escalation; 3) evaluate vancomycin dosing and time to a therapeutic level.

This is a retrospective, single-center, cohort study. Pediatric patients aged 18 years old or younger with Staphylococcus aureus identified from blood cultures and admitted to Michigan Medicine will be included in this study. Patients transferred from an outside hospital facility with insufficient medical records will be excluded. This project is approved by Michigan Medicine IRB. Descriptive statistics will be used to describe patient demographics, microbiologic culture data, and infection characteristics. Student's t-test and chi-square tests will be used to evaluate continuous and dichotomous variables, respectively. A regression analysis will also be conducted to identify risk factors associated with the primary objective of this study. Results and conclusion will be presented at Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss the prevalence of Staphylococcus aureus bacteremia.

Outline the bundle elements proposed for patients with Staphylococcus aureus bacteremia.

Self Assessment Questions:

Staphylococcus aureus bacteremia in pediatric patients can lead to which of the following:

A. Prolonged hospital admission
B. Intensive care unit admission
C. Mortality
D. All of the above

Which of the following scenarios would not be considered compliant to the bundle elements?

A. Repeating blood cultures at least every 48 hours until clearance of bacteria
B. ID consult placed 72 hours after staph aureus identification
C. Targeted antibiotics within 24 hours of mecA or susceptibility results
D. Echocardiogram performed for high-risk patients

Q1 Answer: D Q2 Answer: B

Evaluation of the Safety of Venous Thromboembolism Chemoprophylaxis in Critically Ill Adults with Thrombocytopenia

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Anticoagulation is commonly used in patients admitted to the intensive care unit (ICU) for venous thromboembolism (VTE) prophylaxis. Many of these patients have preexisting or newly developed thrombocytopenia during their ICU admission. The risk of bleeding associated with VTE chemoprophylaxis use and thrombocytopenia has been well defined separately but not concomitantly.

This is a single center, retrospective, cohort study evaluating the bleeding risk associated with VTE chemoprophylaxis in critically ill patients with thrombocytopenia. Inclusion criteria include age â‰¥18 years, admission to an ICU, receipt of VTE chemoprophylaxis >48 hours, and a platelet count between 20,000-150,000 platelets/mcL upon chemoprophylaxis initiation. Exclusion criteria include pregnancy, incarceration, history of immune thrombocytopenia, receipt of therapeutic anticoagulation within 48 hours of chemoprophylaxis initiation, blood transfusions â‰¤24 hours prior to chemoprophylaxis initiation, weight >150 kg, and previous diagnosis of heparin-induced thrombocytopenia. Patients are grouped based on severity of thrombocytopenia: mild-moderate thrombocytopenia defined as a platelet count of 50,000-150,000 platelets/mcL and severe thrombocytopenia defined as a platelet count <50,000 platelets/mcL.

The primary outcome is a composite of major bleeding (fatal bleeding, symptomatic bleeding in a critical area, bleeding causing a hemoglobin drop â‰¥2 g/dL requiring â‰¥2 units of whole blood or red cells) and clinically relevant non-major bleeding (CRNMB; bleeding that does not meet major bleeding criteria but requires medical intervention, increased level of care, and/or face to face evaluation). Secondary outcomes include rate of major bleeding, rate of CRNMB, and rates of thrombotic complications. A priori subgroup analyses will be performed to analyze more specific platelet ranges (e.g., 20,000-40,000 platelets/mcL; 40,000-60,000 platelets/mcL; 60,000-80,000 platelets/mcL).

Data collection and analysis are ongoing. Results will be presented at the Great Lakes Pharmacy Residents Conference in April 2023. Conclusions will be forthcoming based on results.

Learning Objectives:

Explain the common causes of thrombocytopenia in patients admitted to the intensive care unit.

Describe bleeding risks associated with venous thromboembolism prophylaxis and thrombocytopenia.

Self Assessment Questions:

Which of the following is expected to lead to increased platelet consumption?

A. Acute coronary syndrome
B. Chemotherapy use
C. Sepsis
D. Acute alcohol consumption

Which of the following represents the primary outcome of this research project?

A. Evaluate the rate of major and clinically relevant nonmajor bleeding in critically ill patients with thrombocytopenia receiving VTE prophylaxis
B. Evaluate the rate of thrombocytopenia in patients admitted to the ICU
C. Identify risk factors for bleeding in patients with thrombocytopenia
D. Determine the failure rate of VTE prophylaxis in critically ill patients with thrombocytopenia

Q1 Answer: C Q2 Answer: A

Is More the Merrier? Quantifying the Success of Multiple Restriction Types Applied to Medications on a Health System Formulary

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Formulary restrictions are an important component of medication management in health systems. The benefits of implementing formulary restrictions include cost-savings, improved therapeutic outcomes, and continuity of care. Unintended drawbacks include delays in care, added clinician processing time, and risk of medication errors. Understanding appropriateness and compliance with formulary restrictions is important to ensure they are providing the intended benefit and not negatively impacting care; however, literature in this area is lacking. A prior study at Froedtert & the Medical College of Wisconsin (F&MCW) examined percent compliance among medications with a single restriction type and concluded that complicated, indication-based restrictions had the lowest compliance. The purpose of this study is to expand on these findings by examining compliance among medications with more than one restriction type.

The primary outcome of this noninterventional, observational, retrospective study is the percent compliance of each restriction type combination (reported as the mean percent compliance of the individual restrictions that make up that combination). Secondary outcomes include percent compliance of restrictions for individual medications, number of medications per restriction type combination, and number of changes recommended to the Pharmacy and Therapeutics Committee. Medications with more than one restriction type administered between March 1, 2022 and May 31, 2022 were reviewed. Medications with restriction types referring to prior authorization requirement, medication shortage, biosimilar product preference, or association with Risk Evaluation and Mitigation Strategy compliance were excluded. Investigational drugs and medications with less than 5 administrations were also excluded. Restriction compliance is being assessed with reports generated from the electronic health record or manual chart review, if required.

Data analysis is ongoing. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Identify areas in which restrictions can be improved to further increase compliance
Identify different types of formulary restrictions

Self Assessment Questions:

What is a controlled factor that may influence compliance to medication restrictions?

A. Complexity of the restrictions placed
B. Patient population
C. Cost of medications
D. Electronic health record utilized at health system

Which of the following is an example of a â€œclinical situationâ€restriction type?

A. Continuation of home therapy
B. Ordered by neurology
C. Restricted to only the 7.5 mg formulation
D. For use in treatment of tumor lysis syndrome (TLS)

Q1 Answer: A Q2 Answer: D

Sodium polystyrene sulfonate versus sodium zirconium cyclosilicate for treatment of emergent hyperkalemia

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The potassium binders, sodium polystyrene sulfonate (SPS) and sodium zirconium cyclosilicate (SZC), are FDA approved for chronic hyperkalemia. SPS has been utilized in practice but it is associated with gastrointestinal side effects and electrolyte imbalances. Recent literature has demonstrated SZC effectiveness in acute hyperkalemia. One retrospective study has compared acute potassium reduction of insulin and glucose (IG) against SPS, SZC, and IG + SZC, but not IG + SPS. We aim to examine if SZC and IG + SZC reduce potassium to a similar extent as SPS, IG, and IG + SPS in acute hyperkalemia.

Statement of Methods:
This retrospective, observational study will include inpatients â‰¥ 18 years of age with a serum potassium concentration â‰¥ 5.5 mEq/L who were hospitalized for at least 24 hours post potassium binder administration from October 1, 2019 to June 30, 2022. Chronic potassium binder use, history of bowel impaction, bowel surgery within the past six months, ileus or bowel obstruction, pseudohyperkalemia, diabetic ketoacidosis, concurrent use of sorbitol, or if they received hemodialysis within four hours. Patients will be separated into SPS, SZC, IG + SPS, and IG + SZC. The primary outcome is mean change in serum potassium concentration from baseline within the first 24 hours. Convenience sampling will be employed for patient inclusion. Secondary outcomes include mean change in serum potassium from baseline to first serum potassium collected and within 48-hours, proportion achieving potassium concentration â‰¤ 5.5 mEq/L and 5.0 mEq/L at 24 and 48 hours, mean time to potassium concentration â‰¤ 5.5 and â‰¤ 5.0 mEq/L, patients requiring additional potassium-lowering therapy within 24 hours, and dialysis need within eight hours. Safety outcomes will include incidence of hypoglycemia, hypokalemia, nausea, edema, hypocalcemia, hypomagnesemia, and interstitial necrosis.
Results and conclusion will be reported at the Great Lakes Pharmacy Resident Conference.
Learning Objectives:
Outline the differences between sodium polystyrene sulfonate and sodium zirconium cyclosilicate for patients with acute hyperkalemia
Review current literature for the use of potassium binders in patients with acute hyperkalemia
Self Assessment Questions:
1. A patient is admitted into the emergency department for heart palpitations. Upon lab work and an ECG, the patient was found to have a serum potassium concentration of 5.6 mEq/L and peaked T waves. The medial resident orders calcium gluconate 1 g intravenous for one dose. The medical resident then turns to you and asks which potassium binder has the fastest onset of action. What do you tell the medical resident?
A. Patiromer
B. Sodium zirconium cyclosilicate
C. Sodium polystyrene sulfonate
D. B and C
2. The 2022 observational study by Yao and colleagues found a greater potassium reduction with which agent (or combination of agents)?
A. Insulin and glucose
B. Sodium zirconium cyclosilicate
C. Insulin and glucose with sodium zirconium cyclosilicate
D. Sodium polystyrene sulfonate
Q1 Answer: D Q2 Answer: C

Rivaroxaban for Venous Thromboembolism Prophylaxis in Acutely Ill Medical Patients
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Background: To prevent venous thromboembolism (VTE) in acutely ill medical patients, guidelines recommend use of low-molecular-weight-heparin (LMWH). Routine use of extended-duration, outpatient prophylaxis is not currently recommended due to its risk of bleeding; however, studies have shown that over 50% of thrombotic episodes may occur after hospitalization. A sub-population analysis of the MAGELLAN trial found the use rivaroxaban to be non-inferior at 10 days and superior at 35 days in reducing the composite outcome of asymptomatic proximal and symptomatic VTE as compared to LMWH. However, its place in clinical practice is still limited due to the lack of data demonstrating the benefits of rivaroxaban in reducing hospital readmission rates and cost saving.
Purpose: To evaluate the effects of using rivaroxaban for VTE prophylaxis on hospital readmission rates and its potential cost-saving benefits.
Methods: This is a pre/post-intervention quasi-experimental study within the Froedtert Enterprise. Inclusion criteria include patients â‰¥18 years, admitted to the medicine service with an acute medical illnesses. Patients were excluded if they received therapeutic anticoagulation, fibrinolytic agents, dual antiplatelet therapy, or aspirin dose â‰¥ 162 mg per day prior to or during their hospitalization. Those with risk factors for major bleeding or comorbidities that can increase bleeding risk, documented hypersensitivity to either agent, or unable to and/or unwilling to take rivaroxaban were also excluded. The intervention consisted of provider and pharmacist education via a pocket card detailing inclusion and exclusion criteria. Select eligible patients from post-intervention group were additionally continued on VTE prophylaxis outpatient for a total duration of 31 to 39 days. The primary outcome was to evaluate all-cause 60-day hospital readmission rates. Secondary outcomes include readmission rates due to VTE, rates of major and minor bleeding, and cost-saving benefits.
Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.
Learning Objectives:
List alternative oral options for VTE prophylaxis during hospitalization for acute ill medical patients

Identify sub-set patient populations that can be safely continued on rivaroxaban for VTE prophylaxis after discharge

Self Assessment Questions:

Which of the following direct oral anticoagulation agents would be the most appropriate option to use as VTE prophylaxis in acutely ill medical patients who require hospitalization in place of LMWH or subcutaneous heparin?

A. Apixaban
B. Edoxaban
C. Rivaroxaban
D. All of the above

Which of the following patients could safely receive rivaroxaban therapy at discharge for VTE prophylaxis based on the results of the MAGELLAN subpopulation analysis?

A. 80 year-old male who was hospitalized for a skin and soft tissue infection with past medical history significant for diabetes and osteoarthritis
B. 40 year-old female who was hospitalized for asthma exacerbation with no significant past medical history
C. 50 year-old male who was hospitalized for acute coronary syndrome status post stent placement and was discharged with aspirin 81 mg daily and clopidogrel 75 mg daily
D. 20 year-old female who was hospitalized for gastrointestinal bleed with no significant past medical history

Q1 Answer: C Q2 Answer: B

Evaluation of short versus long course treatment of non-deep seated actinomyces infections: a 10-year, single center, retrospective experience

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Actinomyces are normal flora of the human oropharynx, gastrointestinal tract, and female genitourinary tract but disruptions of the mucosal barrier can lead to deeper tissue penetration requiring extensive antibiotic therapy and source control. Infections are characterized by the presence of sulfur granules and filamentous growth on surgical pathology. Due to overall low resistance and limited literature, penicillins remain the drugs of choice, but treatment durations remain poorly understood. Thus, current practice regarding duration of therapy remains widely variable. The purpose of this study was to evaluate infection recurrence between short and long courses of antibiotic therapy.

This was a single-center, retrospective cohort study of adult patients admitted to an urban, academic, quaternary referral center in between January 1, 2012, and June 30, 2021. Inclusion criteria were actinomyces in blood, tissue, or body fluid cultures. Exclusion criteria were deep-seated infections defined as endocarditis, meningitis, osteomyelitis, and empyema as well as death within 48 hours of positive cultures, pregnancy, and incarceration. The primary outcome was the proportion of patients with infection recurrence. Infection recurrence was defined as 1 or more tissue, blood, or body fluid cultures positive for actinomyces 24 hours after antibiotic therapy discontinuation. A 12-month follow up was conducted to assess for infection recurrence following the completion of the antibiotic course. Secondary outcomes were all-cause hospital mortality, 12-month all-cause mortality, time frame of infection recurrence (3, 6, and 9 months). A convenience sample was used. Data and outcomes were compared using Chi-square or Fisherâ€™s exact test for categorical data and Studentâ€™s t-test or Wilcoxon Rank Sum for continuous data, as appropriate. A multivariate logistic regression was performed to determine risk factors for infection recurrence.

Data collection and analysis is ongoing. Final results will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recognize the risk factors associated with the development of non-deep-seated actinomyces infections.
Describe the preferred treatment regimen for non-deep-seated actinomyces infections.

Self Assessment Questions:

Which of the following is a risk factor for actinomycosis?

A. History of persistent depressive disorder
B. Lorazepam therapy
C. Face and leg wounds
D. Female sex

Which of the following is a risk factor for actinomyces?

A. Meropenem
B. Levofloxacin
C. Penicillin G
D. Doxycycline

Q1 Answer: C Q2 Answer: C

Urinalysis and urine culture ordering in the Emergency Department

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Overtreatment of urinary tract infections (UTIs) is a serious public health problem, as it leads to overuse of antibiotics, and thereby increasing adverse events, antibiotic resistance, increased C.difficile infections, and increased length of stay in hospitalized patients. We hypothesize that decreasing the urinalysis (UA)/urine culture (UC) ordering rates will decrease the initiation of antimicrobial treatment. Our primary endpoint is to improve adherence to our health systemâ€™s UTI quality improvement protocol and our secondary endpoint is to decrease total Rocephin use. Plan. Do. Check. Act. Method was used to assess pre-education UA/UC ordering patterns in the Emergency Departments (EDs) at Saint Joseph Regional Medical Center. Providers and other clinical staff were then educated on appropriate ordering criteria, and then a post-education UA/UC ordering pattern was evaluated. The first step included assessing ED patient admission reports, and gathering data. After data collection, we set up educational meetings. The final step is daily monitoring of UC orders and antibiotic treatment, with continual real-time education. Based on the data collected, three categories were initially identified: UA appropriately ordered and appropriately treated or not treated (17.9% pre-education vs 41% post education), UA inappropriately ordered but appropriately not treated (63.5% pre-education vs 48.4% post-education), and UA inappropriately ordered and inappropriately treated (16% pre-education vs 4.2% post-education). A new category, UA appropriately ordered but was inappropriately treated or not treated, was added post-education and the preliminary data was 6.3%. Pre-education, we observed a large number of UAs ordered due to shortness of breath, chest pain, and non-specific urinary symptoms such as altered mental status, generalized weakness, and dizziness. Although we continue to observe areas of improvement for appropriate UA/UC ordering post-education, we have observed the number of appropriately ordered and treated UTIs has increased preliminarily. We strive to continue to educate and reinforce UTI diagnostic stewardship.

Learning Objectives:

Outline appropriate urinalysis and urine culture ordering criteria

Indicate appropriate urinary tract infection treatment plan

Self Assessment Questions:

Which of the following is an appropriate indication to order urinalysis/urine culture?

A. Abdominal Pain without any systemic signs of infection

B. Urgency, frequency, dysuria

C. Headache

D. "Thick" urine

What is the appropriate treatment for asymptomatic bacteriuria?

A. Cephelaxin 500mg PO q12h for 5 days

B. Nitrofurantoin 100mg PO BID for 5 days

C. No treatment recommended

D. Fosfomycin 3mg PO x 1 dose

Q1 Answer: B Q2 Answer: C

Safety of Once-Weekly Dapsone for Pneumocystis jirovecii Pneumonia (PJP) Prophylaxis in Kidney Transplant Recipients

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prophylaxis after renal transplantation. SMX-TMP allergy or intolerance including cytopenias or hyperkalemia may require an alternative drug. Dapsone with standard dosing of 50-100 mg daily is a second-line agent; however, use is limited by hematologic adverse effects such as hemolytic anemia and methemoglobinemia. In 2005, the University of Kentucky (UK) Transplant Center adopted a novel dosing schema of dapsone 100 mg once weekly as a second line agent for PJP prophylaxis and has since published retrospective data supporting its efficacy compared to SMX-TMP in abdominal transplant recipients. However, this study did not evaluate the rate of hematologic adverse events in each group. The purpose of this study is to determine if once weekly dapsone has significantly different hematologic adverse effects in kidney transplant patients when compared to SMX-TMP for PJP prophylaxis.

Methods: This retrospective, single-center cohort study included adult patients that received a kidney transplant at UK Transplant Center between 01/01/2016 and 12/31/2021 and were prescribed sulfamethoxazole-trimethoprim or weekly dapsone for PJP prophylaxis. Exclusion criteria included multi-organ transplants, previous non-renal transplant, HIV positive status, and mortality within 6 months of transplant. Patients were assigned to a cohort based on the PJP prophylactic agent prescribed at post-operative day 30. Results were summarized using means with standard deviation or frequencies where appropriate. Continuous data were evaluated using an unpaired studentâ€™s t-test, whereas nominal data were evaluated using chi-square analysis.

Results and Conclusion: Data is currently being collected, and results will be presented at the conference.

Learning Objectives:

Outline first and second line therapies for Pneumocystis jirovecii pneumonia prophylaxis

Describe the hematologic adverse effect profile of once weekly dapsone

Self Assessment Questions:

Which of the following is NOT a known adverse effect of daily dapsone?

A. Hyperkalemia
B. Methemoglobinemia
C. Agranulocytosis
D. Hemolytic anemia

What is the most common reason sulfamethoxazole-trimethoprim is not used for PJP prophylaxis?
A. Allergy or intolerance to sulfamethoxazole-trimethoprim
B. Hyperkalemia
C. Renal insufficiency
D. Agranulocytosis

Q1 Answer: A Q2 Answer: A

Review of Pharmacist-Driven Culture Review in the ED and Development of an Antibiotic Selection Guide for Outpatient Therapy

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Background
Antibiotics prescribed for urinary tract infections (UTI) for patients discharged from the emergency department (ED) are empiric, given the delay between time of culture collection and result. Therefore, culture review once culture and susceptibility results are available is imperative to ensure that the patient is receiving targeted antibiotic therapy in a timely manner. With more than 1 million ED visits each year resulting from UTIs, there is a vast opportunity for pharmacists to take part in culture review and optimize antibiotic treatment. Pharmacist-driven culture review has been in place at Froedtert Hospital since 2012 and was expanded to the Froedtert Community Hospital Division in 2020.
Objective
This study aims to evaluate the impact of emergency medicine (EM) pharmacists in the current culture review process and inform opportunities for future expansion.
Methods
This retrospective study examines pharmacist involvement in review of urine cultures collected during ED encounters in patients discharged from the ED. Chart review was completed in patients for whom cultures were collected at Froedtert Hospital or the Froedtert Community Hospital Division between January 1, 2022 and June 30, 2022. Data was collected using the institutional electronic health record.
Outcomes
The primary outcome of this study is to determine the percentage of urine cultures reviewed by an EM pharmacist that additionally had an associated intervention. Secondary outcomes will examine average number of cultures reviewed by an EM pharmacist per day, average time between resulted culture and EM pharmacist review, percentage of EM pharmacist interventions accepted by providers, percentage of empiric antibiotics discontinued, and the number of missed opportunities for intervention by an EM pharmacist.
Results/Conclusions
Data analysis is ongoing. Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:
Define the benefits of pharmacist culture review in the emergency department
Explain how pharmacists are well positioned to review urine culture results in the ED and make recommendations on targeted antibiotic therapy

Self Assessment Questions:
What is a benefit of pharmacist culture review in the emergency department?
A. Accurate antibiotic recommendation
B. Longer time to culture review
C. Increased cost to the patient
D. Polypharmacy

When compared to ED charge nurses and advanced practice providers, pharmacists are well positioned to improve _____ as part of the urine culture review process:
A. Diagnosis of UTIs
B. Antimicrobial stewardship
C. Time to culture collection
D. Medication history documentation

Q1 Answer: A Q2 Answer: B

Real-World Efficacy of Long-Acting Cabotegravir and Rilpivirine in an Urban HIV Clinic

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Purpose

Long-Acting cabotegravir/rilpivirine (LA-CAB/RPV) was FDA approved in 2021 for treatment of HIV-1 in patients with undetectable viral loads who have no history of resistance or treatment failure to either agent. It is the only complete long-acting injectable (LAI) antiretroviral therapy (ART) regimen. In clinical trials, LA-CAB/RPV has proven to be highly effective in maintaining virologic suppression. There is limited published real-world data regarding efficacy, adherence, and discontinuation rates especially in populations underrepresented or excluded from clinical trials. The purpose of this study is to evaluate the real-world efficacy of LA-CAB/RPV in achieving and maintaining virologic suppression in people living with HIV.

Methods

This study is a retrospective electronic chart review of HIV-1 positive patients receiving care at the Ruth M. Rothstein CORE Center who received at least one dose of LA-CAB/RPV between January 1, 2022 and October 31, 2022. Patients were excluded if they are under the age of 18. The primary outcome is virologic suppression as defined by HIV viral load < 50 copies/mL at weeks 4, 12, 24, and 48. Secondary outcomes include adherence and discontinuation rates. Baseline data collected includes age, gender, race/ethnicity, BMI, primary insurance type, history of gluteal augmentation, HIV viral load, CD4 count, resistance testing, and previous ART regimens.

Results/Conclusion

Data collection and analysis is currently ongoing. Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Describe the benefits of long-acting injectable antiretroviral therapy

Identify key patient counseling points for long-acting cabotegravir and rilpivirine (LA-CAB/RPV)

Self Assessment Questions:

A potential benefit of LA-CAB/RPV compared to oral antiretroviral therapy is:

A. Less privacy
B. More pill fatigue
C. Less frequent appointments
D. Less frequent dosing

Which of the follow is a key patient counseling point prior to LA-CAB/RPV initiation?

A. Doses are administered as a single-injection
B. Injections are administered every 3 months
C. The most common side effect is injection site reaction
D. An oral lead-in with cabotegravir and rilpivirine is required

Q1 Answer: D Q2 Answer: C

The Use of Epoprostenol for CRRT Circuit Patency

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Purpose: Continuous renal replacement therapy (CRRT) is a commonly used in critically ill patients unable to tolerate intermittent hemodialysis. Clotting of the circuit due to the interaction of blood with the foreign surface of the extracorporeal circuit is a known complication. In patients without an indication for systemic anticoagulation, the 2012 KDIGO Guidelines for Acute Kidney Injury recommend using regional citrate anticoagulation (RCA). More recent studies have reported safety and efficacy with RCA when compared to systemic heparin anticoagulation, but there are potential complications of using RCA. The main disadvantage of RCA is the complexity of calcium monitoring and replacement due to risk of severe hypocalcemia. Minimal data exist for the use of systemic epoprostenol to maintain circuit patency. The primary goal of our study is to evaluate the efficacy and safety of regional epoprostenol to maintain CRRT filter patency.

Methods: This is a retrospective study of adult patients who received intravenous epoprostenol for CRRT filter patency between December 2018 and December 2022. Patients were excluded if they received IV epoprostenol for other indications and they were excluded from the primary outcome if they received less than 12 hours of therapy. The primary outcome is median CRRT filter life up to 96 hours pre- and post-epoprostenol initiation. Secondary outcomes include the incidence of bleeding and hypotension. A Wilcoxon test will be conducted to evaluate our primary outcome.

Results: 28 patients were reviewed with 21 patients meeting inclusion criteria. The majority of patients were initiated on CRRT for AKI (90%). Patients were slightly more likely to be male (57%) with a mean (SD) age of 61 (13) years. The median SOFA score on the day of CRRT initiation was 13 (IQR 11-15). Data collection is ongoing, final results will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Discuss the current standard of care therapies for anticoagulation during CRRT and their limitations.

Identify risks and benefits of using regional intravenous epoprostenol for CRRT filter patency.

Self Assessment Questions:

Which of the following is recommended by the KDIGO Guidelines as the first line therapy for anticoagulation during CRRT?

A. Regional citrate anticoagulation (RCA)
B. Regional heparin with post-filter protamine

C. Systemic epoprostenol
D. Systemic heparin
Which of the following is a potential adverse effect of using epoprostenol for CRRT filter patency?
A. Hypocalcemia
B. Hypotension
C. Metabolic alkalosis
D. Respiratory failure
Q1 Answer: A Q2 Answer: B

Revision and Validation of the Cystic Fibrosis Pharmacy Scoring Tool (CF-RxS)

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Purpose: Cystic Fibrosis (CF) is a progressive, genetic disease that often requires care from a clinical pharmacist (CP). Most CF centers have one or less full-time effort (FTE) for a CP due to limited resources. It is currently recommended that people with CF (PCF) see their CF center physician or advance care provider quarterly. Currently, there are no guidelines on how often PCF should see their CP, nor a specific tool to help identify PCF with greater treatment complexity. There are previously described tools to describe medication complexity including the Medication Regimen Complexity Index (MRCI) and the Treatment Complexity Score (TCS); however, these tools have various limitations preventing routine application in CF care. In 2020, as part of a quality improvement initiative, a pilot Cystic Fibrosis Pharmacy Scoring Tool (CF-RxS) was developed. The objective of this project is to revise the pilot CF-RxS, through application of expert opinion and evaluation of CP visit data and outcomes.

Methods: In revising the CF-RxS, we will include expert opinion, derived from a survey and subsequent focus group of CP from CF centers within the United States. The survey tool will be disseminated via a Cystic Fibrosis Foundation listserv consisting of CF CP, via Qualtrics. Survey participants will be asked to volunteer for a subsequent focus group to discuss the survey findings. Data from the survey and focus group discussions will be used to draft a revision of the pilot CF-RxS. Using center clinic visit data and outcomes from 11/1/2019-10/31/2022, scores using the revised CF-RxS will be compared to the original CF-RxS, MRCI, and TCS scores. Data will be analyzed via descriptive methods, regression analyses, and Spearman Rho to evaluate correlation between the medication complexity scores using STATA 16.

Results: Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.
Learning Objectives:
Discuss the clinical pharmacistâ€™s role in caring for patients with Cystic Fibrosis.
Describe the revised Cystic Fibrosis Pharmacy Scoring Tool.Â
Self Assessment Questions:
Which of the following is NOT a service provided by pharmacists for patients with Cystic Fibrosis?
A. New start medication counselling
B. Medication laboratory monitoring
C. Medication reconciliation
D. Diagnosis of Cystic Fibrosis Related Diabetes
The Cystic Fibrosis Pharmacy Scoring Tool (CF-RxS) is used to assess which of the following?
A. Medication complexity in Cystic Fibrosis patients
B. Need for medication refills
C. Reported medication allergy
D. Cystic Fibrosis pulmonary exacerbation
Q1 Answer: D Q2 Answer: A

Hitting for the Cycle: Validating Success of a Biosimilar Program

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Biosimilars are biological medications with no clinical differences in safety or efficacy compared to their reference product, and they tend to have lower costs. Biosimilars have potential to allow health systems to decrease spend on biological products and improve reimbursement. Historically, the financial impact of biosimilars at Froedtert & the Medical College of Wisconsin (F&MCW) was minimal due to slow formulary addition of biosimilars, underutilization of products preferred by payers, and reliance on physicians to change products to payersâ€™ preferences. To confront these issues, F&MCW made two interventions. First, a policy was implemented to streamline formulary addition of biosimilars and allow pharmacists to interchange products. Second, algorithms were built into computerized provider order entry (CPOE) to automatically populate the product that best aligned F&MCWâ€™s formulary preferences with products covered by the patientâ€™s payer. To measure the impact of these interventions, F&MCW developed a dashboard summarizing biosimilar use, cost, and reimbursement. The dashboard used historical reimbursement information to project reimbursement for a specific product and payer. The data were not patient-specific, generating concern for the accuracy of the estimations.
This retrospective, data validation and pre-post study evaluated the accuracy of revenue information in the pegfilgrastim biosimilar dashboard and assessed the impact of biosimilar interventions. The primary outcome measured the mean percent difference between the projected pegfilgrastim reimbursement reported in the dashboard and the actual reimbursement extracted from the electronic health record (EHR). Secondary outcomes included the difference in the proportion of preferred, covered, and non-covered pegfilgrastim products before and after policy implementation and CPOE optimization.
The validated dashboard will allow for accurate internal benchmarking of pegfilgrastim use and reimbursement, demonstrate the effects of the interventions, and help establish dashboards for other biosimilars. The findings may justify resources dedicated to optimizing biosimilar use and may uncover additional opportunities for further optimization.

Learning Objectives:

Describe characteristics of biosimilars.
Identify strategies to comply with payer product preferences and increase biosimilar reimbursement.

Self Assessment Questions:

Which is true about biosimilars?
A. Biosimilars are structurally similar to their reference product.
B. Compared to their reference product, biosimilars may be clinically different in safety, but are not clinically different in efficacy.
C. Biosimilars tend to have higher costs than their reference product.
D. Biosimilars are inherently interchangeable, similar to generic small-molecule drugs.
Which of the following interventions could your health system implement to more easily align with payer preferences and maximize biosimilar reimbursement?
A. Allow pharmacist therapeutic interchange of biosimilars, even if they do not have FDA-designated interchangeability
B. Add EHR capabilities to identify the preferred biosimilar for each patient at the time of order entry based on the insurance information coded in the patientâ€™s chart
C. Allow easier formulary addition of biosimilars by utilizing an abbreviated P&T review process for biosimilars when a reference product is already on formulary
D. All of the above
Q1 Answer: A Q2 Answer: D

Implementation of an Adult Parenteral Nutrition Education Program at a Community Hospital System

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Background: Parenteral nutrition preparations are considered high alert medications by the Institute for Safe Medication Practices (ISMP). In a study by Sacks and colleagues in 2009, it was estimated that there are 15.6 errors per 1000 TPN prescriptions. Most common errors involve glucose management, electrolyte or zinc overdose, and calcium/phosphorus precipitation. Pharmacists are heavily involved in every aspect of total parenteral nutrition (TPN) management at Parkview Health. There are several published competencies for pharmacists managing nutrition in addition to guidelines published by the American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.). Currently, Parkview Health does not have a competency standard beyond licensure for management of TPN. A previously published study from Parkview Health has proven the efficacy of an educational program designed for another specialty area. This study has the potential to improve medication safety by increasing confidence and knowledge in topics surrounding the verification and ordering of parenteral nutrition products.

Purpose: The purpose of this study is to develop and implement a parenteral nutrition education series. The success of the series will be measured through confidence surveys and knowledge-based quizzes.

Methods: Six educational modules were developed based on parenteral nutrition guidelines by the American Society of Parenteral and Enteral Nutrition (A.S.P.E.N.). This prospective quality improvement study will assess changes in confidence and competence pre- to post-education. Eligible pharmacists included all in the health system who participate in the dosing or verification of parenteral nutrition preparations. Pharmacists completed a baseline confidence assessment, then proceeded to complete the educational content. For each module, the pharmacist completed a pre-module knowledge-based assessment, then reviewed the content, followed by a post-module assessment. Following the completion of all six modules, the pharmacist completed a post-education confidence assessment.

Results/Conclusions: Results and conclusions will be presented at the 2023 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Identify common challenges for pharmacists when managing parenteral nutrition

Recognize the impact of a parenteral nutrition educational program designed for pharmacists

Self Assessment Questions:

Which of the following statements is correct?

A. ISMP considers parenteral nutrition preparations a high-risk medication

B. Studies show there are less than 10 medication errors per 1000 TPN prescriptions

C. The nutrition support board certification is required to dose parenteral nutrition

D. The most common error in parenteral nutrition management is overfeeding

Which is a potential impact of a parenteral nutrition education series?

A. Decreased pharmacist workload

B. Decreased time to compound parenteral nutrition preparations

C. Increased pharmacist confidence regarding parenteral nutrition

D. Increased number of parenteral nutrition orders

Q1 Answer: A Q2 Answer: C

Implementation of a Protocol for Reduced Enoxaparin Treatment Dosing in Select Populations

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Purpose:
Recommended treatment dosing of enoxaparin can result in over anticoagulation in the morbidly obese population due to inherent pharmacokinetic differences. Because studies underrepresent the morbidly obese population, it is difficult to extrapolate standard dosing recommendations to this population. The purpose of this study is to implement a pharmacy-driven protocol for a reduction of enoxaparin treatment dosing for venous thromboembolism (VTE).

Methods:
A review of current literature was conducted to address the gap in enoxaparin treatment dosing recommendations and monitoring for VTE, which supports an empiric dose reduction of enoxaparin treatment dosing based on actual body weight in morbidly obese patients. The empiric dose reduction resulted in therapeutic anti-Xa levels without an increased risk for bleeding or thrombotic events.

Results:
A pharmacy-driven protocol based on primary literature was developed for use at Community Healthcare System. The protocol implemented a reduction of enoxaparin treatment dosing at 0.75 mg/kg per dose based on actual body weight for morbidly obese patients with a BMI>40 kg/m2 or weighing >150 kg. Patients who qualified for reduction of enoxaparin treatment dosing were evaluated daily by pharmacy, with respective monitoring and dosing adjustments documented within the electronic medical record.

Conclusion:
Additional pharmacy, nursing, and laboratory education is necessary to appropriately implement and evaluate the application of our systemâ€™s reduced enoxaparin treatment dosing and monitoring protocol for select populations.
Learning Objectives:
Explain the guideline recommendations for enoxaparin treatment dosing and monitoring in the morbidly obese population
Identify the impact of current literature on the gap in guidance regarding enoxaparin treatment dosing and monitoring in the morbidly obese population
Self Assessment Questions:
1. According to the CHEST guidelines, what is the recommended dose of enoxaparin for patients presenting with a deep vein thrombosis (DVT) or pulmonary embolism (PE)?
A. 40 mg subcutaneously
B. 1 mg/kg subcutaneously based on actual body weight
C. 30 mg subcutaneously
D. 1 mg/kg subcutaneously based on ideal body weight
What is the preferred parameter for monitoring enoxaparin in select populations?
A. aPTT
B. INR
C. Anti-Xa
D. Fibrinogen
Q1 Answer: B Q2 Answer: C

(Tac)kling Duration in GVHD: Tacrolimus duration effect on GVHD in allogeneic hematopoietic stem cell transplant
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(GVHD). GVHD is the immune response that occurs when the body recognizes the graft as foreign. Immunosuppression with tacrolimus, cyclosporin, sirolimus in combination with post-transplant cyclophosphamide (PTCy) are utilized to prevent GVHD. Tacrolimus duration in regimens including PTCy typically extend to around 180 days. Prolonged immunosuppression with tacrolimus puts patients at risk for opportunistic infections and is associated with challenging drug interactions. Currently, providers utilize different strategies for tapering immunosuppression. Recent studies have shown shortened duration immunosuppression with tacrolimus provides similar incidence of acute GVHD, progression-free survival and relapse-free survival.

The purpose of this project is to first, obtain institutional data regarding tacrolimus taper strategies and duration in GVHD prophylaxis. And secondly, to establish a consensus on appropriate duration of tacrolimus prophylaxis against GVHD post allogeneic HSCT and to minimize toxicities and limit unnecessary prolonged immunosuppression. A multidisciplinary working group was developed to perform a standardized, retrospective chart review assessing adult patients who underwent an allogeneic HSCT at a single institution. Patient characteristics, such as indication for transplant, conditioning regimen, stem cell source, and time to tacrolimus cessation were reviewed. Data will be utilized to develop a protocol for providers to implement consistent taper strategies and durations of immunosuppression.

Anticipated results of this project include identification of patient specific characteristics that impact the safety profile of shortened duration immunosuppression to consider when developing consensus guidelines. The primary outcome is to assess safety of shortened-duration tacrolimus by percentage of severe grade III-IV acute GVHD. Secondary outcomes include assessing efficacy through survival data examining the percentage of patients who are alive and without relapse or progression of primary disease.

Learning Objectives:
Identify different approaches to tacrolimus duration in graft versus host in allogeneic hematopoietic stem cell transplant recipients
Discuss safety and efficacy of an early taper approach in GVHD prophylaxis.
Self Assessment Questions:
The standard approach to GVHD prophylaxis after hematopoietic stem cell transplantation is which of the following?
A. Life long immunosuppression with tacrolimus and mycophenolate mofetil post transplant
B. Tacrolimus for 180 days post transplant
C. Methotrexate & sirolimus for 1 month post transplant
D. Tacrolimus for 2 years post transplant
What is a safety concern associated with prolonged duration of tacrolimus for GVHD prophylaxis after hematopoietic stem cell transplant?
A. serotonin syndrome
B. respiratory distress syndrome
C. hepatotoxicity
D. Nephrotoxicity
Q1 Answer: B Q2 Answer: D

Development of a Guideline for the Use of Continuous Infusion Neuromuscular Blocking Agents

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acute care patient population. Since NMBAs do not contain sedative or analgesic properties, it is essential that patients treated with these agents are administered concomitant analgosedation medications to ensure compassionate patient care. The purpose of this project is to implement an institution-wide NMBA guideline and modification of the standardized order set to improve the safe and effective use of NMBAs agents at our institution.

Methods: This is a single center, pre- and post-implementation analysis of patients 18 years of age or older admitted to an intensive care unit on a continuous infusion NMBA. Patients who are pregnant will be excluded. Data will be collected for a period of 4 months prior to and 4 months after implementation of the guideline. The primary outcome will be the percent change in the number of patients adequately sedated prior to and during the first 24 hours of NMBA therapy before and after implementation of a NMBA guideline and modified order set. Secondary outcomes will include percent change in the number of patients adequately sedated prior to and during each 24-hour period while on NMBA therapy, documented RASS scores prior to initiation of continuous infusion NMBA, and NMBA order set usage before and after implementation of the guideline and modified order set. Adequate sedation will be defined as a patient who receives a continuous infusion sedative medication without dose reductions and achieves a Richmond Agitation-Sedation Scale (RASS) score of -5 or a Bispectral Index (BIS) score of â‰¤ 60 while on NMBA infusion therapy.

Results: Preliminary data will be presented at the Great Lakes Pharmacy Resident Conference.

Conclusions: Conclusions are currently pending implementation of the guideline and 4 months of pre- and post-implementation data.

Learning Objectives:
Define appropriate sedation goals for patients receiving continuous infusion neuromuscular blocking agents.
Explain how RASS and BIS scoring tools differ from one another.
Self Assessment Questions:
1. Which of the following is an appropriate RASS goal for a patient that will be initiated on a continuous infusion of cisatracurium?
A. RASS of 0
B. RASS of -5
C. RASS of 5
D. RASS of 1
Which of the following is true regarding sedation during continuous infusion NMBA therapy?
A. While paralyzed, RASS is not a reliable scoring tool alone to ensure deep sedation
B. A higher BIS score corresponds to deeper sedation
C. Patients may be lightly sedated prior to and during NMBA therapy
D. Sedation can be titrated down to achieve a RASS score of -1 while a patient is receiving NMBA therapy
Q1 Answer: B Q2 Answer: A

Association of triglyceride level and clinical outcomes in propofol-induced hypertriglyceridemia.
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sedative agents include benzodiazepines, dexmedetomidine, and propofol. The 2018 Pain, Agitation/Sedation, Delirium, Immobility and Sleep Disruption guidelines recommend the use of non-benzodiazepine sedatives in mechanically ventilated patients, as benzodiazepine-based regimens have been associated with worse outcomes, such as longer ICU length of stay (LOS), longer duration of mechanical ventilation, and increased risk of delirium. Propofol is a favorable option because of its rapid onset and short duration of action, however, it is not without complications. Propofol is formulated in a 10% oil-in-water emulsion that contains soybean oil, which can lead to elevated triglyceride (TG) levels. Hypertriglyceridemia (HTG) secondary to propofol has yet to be consistently defined but expert opinion has described it as >400 mg/dL. The incidence of propofol related HTG has been found to be 15-40%, however the clinical outcomes associated with elevated TG levels has yet to be established. The purpose of this study is to investigate clinical outcomes with propofol-induced HTG and determine if therapy can be continued to prevent the transition to less favorable sedatives.

Methods: This was a single-center, observational, retrospective, cohort study conducted on mechanically ventilated patients admitted to the surgical/trauma ICU or medical ICU from July 1, 2019 to July 31, 2022 at Loyola University Medical Center. Patients were included if they received continuous infusion propofol for â‰¥48 hours, and patients that received continuous infusions of benzodiazepines were excluded. The primary endpoint was ICU LOS. Secondary outcomes included duration of mechanical ventilation, hospital LOS, in-hospital and 28-day mortality. A multivariate linear regression was used to determine if elevated triglyceride levels were independently associated with worse clinical outcomes.

Results: Results and conclusions will be presented at the 2023 Great Lakes Pharmacy Residency Conference.

Learning Objectives:
Describe the incidence of propofol-induced hypertriglyceridemia.
Identify the relationship between hypertriglyceridemia and ICU length of stay.
Self Assessment Questions:
Compared to other continuous sedatives, which of the following adverse effects is unique to propofol?
A. Hypotension
B. Respiratory depression
C. Hypertriglyceridemia
D. Tachycardia
When compared to propofol, benzodiazepines have been associated with which of the following?
A. Longer ICU length of stay
B. Increased rates of ICU delirium
C. Longer duration of mechanical ventilation
D. All of the above
Q1 Answer: C Q2 Answer: D

Creation of a Workload Tracking Program for Centralized Services Production at an Academic Medical Center
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The purpose of this project is to perform time studies on each service at PSB to gain an understanding of the workload required of each shift and area. There is currently no literature on productivity standards in consolidated centralized services. By understanding the productivity that PSB currently holds, we will be able to expand on the services currently offered with current FTE. This will also provide a means to monitor productivity of staff and hold each accountable. Objectives include the following: 1) Determine the workload and productivity statistics of each area, 2) Create a flexible tracking system to allow for real-time monitoring of workload, and 3) Propose a modification to workload for the FY24 budget.
Objective 1 methods: (1) Identify a list of metrics for each operational area of PSB, (2) Determine a time weight for each task.
Objective 2 methods: (1) Review any literature that focuses on productivity management in pharmacy or healthcare, (2) Build a usable workload tracker to understand current workload and proposed workload.
Objective 3 methods: (1) Evaluate new work proposals for PSB and understand what roles could undertake additional workload, (2) Utilize data collected regarding workload to update budget spreadsheet accordingly, (3) Present any new findings and/or budget needs to the Finance Department
Review of 6 out of 15 positions revealed that workload was being underreported when including the time needed for an entire task. Time study data showed that some positions were requiring more resources to complete daily requirements than other shifts. Current data shows that more FTE are not needed to keep up with the current workload, a reanalysis of the staffing structure to support the positions with higher workload is needed.

To be presented at the Great Lakes Pharmacy Resident Conference.
Learning Objectives:
Outline steps to determine workload and productivity statistics for a technician staffing area
Review steps to build a usable workload tracker to understand current and proposed workload
Self Assessment Questions:
What is the value of tracking productivity?
A. To understand the time and resources needed to complete a task
B. To see if the staffing model is appropriate for the work at hand
C. To evaluate efficiency of the staff
D. All the above
What is the purpose of the IF function in Excel?
A. To decide if your formula is appropriate for the data
B. It allows you to return a value if a condition is true
C. To search for data and replace it
D. To average data for a group of cells
Q1 Answer: D Q2 Answer: B

PREDICTORS OF SELECTIVE SEROTONIN REUPTAKE INHIBITOR TREATMENT FAILURE IN PERSONS WITH CYSTIC FIBROSIS
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Purpose: Depression and anxiety have been estimated to effect up to 33% of adult and 25% of pediatric persons with cystic fibrosis (CF). Genetic polymorphisms in CYP2C19 and CYP2D6 have been well-established as predictors of selective serotonin reuptake inhibitors (SSRIs) treatment failure in the general population, yet have not been studied specifically in persons with CF. Clinical pharmacology in persons with CF differ from the general population due to pharmacokinetic variations and CF liver disease, but the impact of pharmacogenetic polymorphisms in this population is unknown. The purpose of this study was to determine the rate of SSRI failure in persons with CF and to identify factors that predict treatment failure.

Methods: A retrospective chart review was conducted of persons with CF prescribed an SSRI for depression or anxiety at Indiana University Health from January 2015 to September 2021. Subjects were excluded if no follow-up was available after SSRI initiation. To identify factors that predict SSRI failure, we collected demographics, initial SSRI, drug-drug interactions, CYP2D6 and CYP2C19 genotype (when available), pre-SSRI and post-SSRI Patient Health Questionnaire-9 scores, presence of liver disease, and pulmonary function tests. Subjects were grouped into two groups: SSRI failure and success; collected factors were compared between the two groups. Failure of SSRI was defined as discontinuation due to adverse drug reaction, drug change, or dose change after initial dose titration period. When pharmacogenetic test results were available, rates of SSRI failure were compared between persons dosed according to the Clinical Pharmacogenetics Implementation Consortium (CPIC) 2015 guideline and those not dosed per CPIC guidelines. Chi-square test and independent t-test were used to compare continuous and categorical variables, respectively, between groups of treatment success and treatment failure.

Results and Conclusion: Data collection and analysis are in progress. Results will be presented at the 2023 Great Lakes Resident Conference.
Learning Objectives:
Describe the importance of appropriate treatment of anxiety and depression in persons with cystic fibrosis
Identify differences in clinical pharmacology in persons with cystic fibrosis compared to the general population
Self Assessment Questions:
What percentage of persons with CF are reported to receive treatment for mental health disorders including anxiety and depression?

A. <1%
B. 25-35-%
C. 50-60%
D. >90%
Clinical pharmacology in persons with CF differ from age matched general population due to:
A. Decreased drug absorption
B. Decreased volume of distribution
C. Decreased drug clearance
D. Altered CYP enzyme activity
Q1 Answer: B Q2 Answer: A

Assessment of Risk Factors for Development of Inpatient Hypoglycemia

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Statement of Purpose:
The primary objective of this study is to determine risk factors which may predict diabetic patients at increased risk of developing hypoglycemia at Community Hospital.

Background:
Hypoglycemia is one of the most common major complications for patients with diabetes mellitus (DM) while admitted. Episodes of inpatient hypoglycemia are associated with increased morbidity, mortality, and length of stay. Unfortunately, hypoglycemic events are a multi-faceted problem that combine aspects of drug timing, administration, interactions, and patient specific factors. Due to the variance in etiologies of hypoglycemia, understanding risk factors for potential hypoglycemic episodes may allow for the creation of preventative policies. Current literature provides multiple studies which assess risk factors for development of iatrogenic hypoglycemia at a plethora of different hospital sites, however, these studies lack consistency in measured endpoints.

Methods:
This is a retrospective, single center risk factor analysis, over a 6-month period (6/21/22-12/21/22), of diabetic patients who had a hypoglycemic event (defined as blood glucose < 70 mg/dL) compared to those that did not. Patients will be included if they are >18 years old, had a diagnosis of DM, and had a hospital stay greater than 24 hours. Patients will be excluded if they were initiated on IV insulin for any reason, had a hypoglycemic event within 24 hours of admission, or were a repeat admission from an included encounter. Selected patients will be separated into two groups based on whether they developed iatrogenic hypoglycemia or not. Data collected includes baseline demographics, prior to admission medications, baseline clinical characteristics, and clinical interventions. Descriptive statistics and univariate statistics will be performed for continuous and categorical variables, and all p-values > 0.2 will be included in a multivariate logistic regression.

Results and Conclusions:
Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.
Learning Objectives:
Discuss risk factors which may predispose patients to iatrogenic hypoglycemia
Describe the consequences of iatrogenic hypoglycemia
Self Assessment Questions:
Which of the following complications has been associated with iatrogenic hypoglycemia?
A. Decreased patient length of stay
B. Increased risk of ischemic stroke while inpatient
C. Decreased healthcare costs to hospital
D. Increased patient mortality
Which of the following risk factors are commonly associated with the development of iatrogenic hypoglycemia?
A. Sudden change in diet or nutrition
B. Administration of methocarbamol
C. Administration of propofol
D. COVID-19 infection
Q1 Answer: D Q2 Answer: A

Relationship between Ceftriaxone and Hypoalbuminemia and Potential Impact on Clinical Dosing Strategies

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Purpose: Serum albumin acts as a binding site for endogenous steroids, fatty acids, bilirubin, and exogenous drugs. Hypoalbuminemia has clinical relevance related to antibiotic pharmacodynamics and pharmacokinetics. Ceftriaxone is one of the most frequently ordered antibiotics in the inpatient setting for a variety of bacterial infections and is frequently initiated in the emergency department. The purpose of this study is to assess the frequency of hypoalbuminemia in patients receiving ceftriaxone in a community hospital emergency department.
Methods: This study is a single-center retrospective review. The primary objective is the proportion of patients with documented hypoalbuminemia (defined as serum albumin < 2.5 g/dL) who receive ceftriaxone in the ED. Data will be identified from the electronic medical record for adult patients presenting to SwedishAmerican Hospital from January 1, 2022 through June 30, 2022 who received at least one dose of ceftriaxone in the emergency department and from whom a serum albumin concentration is obtained. Data to be collected will include baseline characteristics, vital signs, ceftriaxone indication, dose, and duration, serum albumin, serum creatinine, and platelet count, as well as hospital and intensive care unit length of stay, if applicable. Exclusions will be patients with prison inmate status, pregnant patients, and patients without appropriate laboratory values to assess outcomes of interest.
Results/Conclusions: Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.
Learning Objectives:
Describe the proposed rationale for dose adjustments for drugs based on degree of protein binding.
Explain the pharmacokinetic properties of ceftriaxone in both the critically ill and non-critically ill patient.
Self Assessment Questions:
Which is a pharmacokinetic property of ceftriaxone?
A. Low tissue penetration
B. ~90% protein-bound
C. Concentration-dependent bactericidal activity
D. Half-life of 24 hours
Which is true regarding the association between highly protein-bound drugs and serum albumin?
A. Unbound drug remains in circulation longer than bound drug.
B. Only bound drug can be eliminated by the liver and kidneys.
C. The majority of critically ill patients have been found to have increased serum albumin concentrations.
D. Hypoalbuminemia increases volume of distribution.
Q1 Answer: B Q2 Answer: D

Development of a Business Case for a Multidisciplinary Perioperative Surgical Home
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Purpose:
Surgical procedures and the delivery of anesthesia may cause physiological changes that can increase morbidity and mortality. Detailed knowledge of the patientâ€™s underlying medical condition and co-morbidities plays an important clinical role in their perioperative management to mitigate risk and enhance the quality of care that a patient receives. The Perioperative Surgical Home (PSH) model is a surgery-focused model employing a microsystem of providers and processes to collaboratively work toward mitigating disjointed and fragmented care. The PSH model is designed with the aim of minimizing risk factors associated with increased perioperative morbidity and mortality. Through the use of standardized surgical protocols, the PSH model improves efficiency, increases patient satisfaction, and reduces surgical cancellations. Furthermore, the model reduces hospital length of stay, re-hospitalizations, and in-hospital morbidity and mortality. The objective of this study is to assess the barriers to and facilitators of implementation of a one-stop PSH at Community Hospital to define the pharmacistâ€™s role in pre-surgical evaluation of patients and optimization of perioperative drug therapy management.

Methods:
This was a strengths, weaknesses, opportunities, and threats (SWOT) analysis of the current pre-surgical evaluation process at Community Hospital. The analysis looked to identify opportunities for improvement in the perioperative management of anemia, diabetes, pain, anticoagulation, and antiplatelet medication therapy to establish standardized protocols for perioperative management of these conditions in a collaborative effort between the Department of Anesthesiology, Pain and Perioperative Medicine and the Department of Pharmacy. The primary endpoint was the development and approval of algorithms for perioperative management by pharmacists in the Perioperative Surgical Home/Anesthesia Presurgical Evaluation Clinic. The secondary endpoints included the assessment of current perioperative care quality measures and cost and the development of future quality metrics for clinic and costs.

Results and Conclusion:
Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.
Learning Objectives:
Describe â€¢Describe the role of Perioperative Surgical Home in the perioperative management of patients
Define â€¢Define the pharmacistâ€™s role in pre-surgical evaluation and perioperative management of patientsâ€™ drug therapy

Self Assessment Questions:

1. Perioperative Surgical Home model integrates which of the following components?
 A. Fragmented perioperative care
 B. Patient-centered approach to care
 C. Worse patient outcomes
 D. Reimbursement based care
2. The Perioperative Surgical Home model has the potential to drive meaningful and lasting improvement in patient outcomes through which of the following?
 A. Increase of surgical cancellations
 B. Increase in hospital length of stay and re-hospitalization
 C. Reduction in in-hospital morbidity and mortality
 D. Patient dissatisfaction

Q1 Answer: B Q2 Answer: C

Developing a Curricular Plan for a PGY-1 Pharmacy Residency at a Critical Access Hospital

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Purpose: There are not enough pharmacy residencies available for current promising applicants, with the consistent match rate being about 65% for a number of years. Few American Society of Health-System Pharmacists (ASHP) - accredited PGY-1 pharmacy residencies are conducted in designated critical access hospitals. There is a need for rural health care providers with 20% of the population living in rural communities and only 11% of healthcare providers caring for the rural community. Developing PGY1 pharmacy residencies in critical access hospitals (CAH) may help address both the need for pharmacists in rural practice and the need for additional opportunity for post-graduate training. Gundersen Health System has six affiliated CAH with autonomous pharmacy services. The purpose of this project is to design the layout for implementing a PGY-1 residency at a Gundersen Health System critical access hospital.

Methods: A thorough review of the ASHP pharmacy residency rules, requirements, goals, and objectives was completed. Questionnaires were sent to the director of pharmacy at each Gundersen Health System critical access hospital. The questionnaire assessed pharmacy involvement within the hospital and the opportunities that may be available to a resident. These questionnaires were quantified and reviewed. Based on the information from the questionnaires and the logistical locations, there were site visits to four Gundersen Health System critical access hospitals. Each site was evaluated with the same questions to better understand which sites may be able to provide a residency that could meet the required ASHP goals and objectives. Detailed lists of the benefits and limitations on the various structure options were created and assessed. The comprehensive structure of the PGY-1 pharmacy residency will be composed and evaluated based on ASHP accreditation standard.

Results/Conclusion: Final curriculum is ongoing. The complete layout for implementation will be presented at the 2023 Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Recognize the need for a PGY-1 pharmacy residency in a rural health community.
Identify characteristics of the curriculum for a PGY-1 rural pharmacy residency that will best meet the ASHP goals and objectives.

Self Assessment Questions:

Which factor has not been shown to influence a provider choosing to practice in rural health?
 A. Growing up in a rural community
 B. Financial incentives
 C. Experience in a rural health setting as a student or resident
 D. Early exposure to practice in rural communities

Which of the following is true regarding the curriculum of a rural health residency?
 A. Completing residency at one facility is best as it allows for continuity for the resident.
 B. There are minimal rotations that are available, and residents need to spend at least half of the year at a larger facility to meet the requirements.
 C. Staffing opportunities are limited given the position is already filled by the staff pharmacist.
 D. Longitudinal rotations allow for more flexibility with the uncertainty of rural health.

Q1 Answer: B Q2 Answer: D

Establishing a Sustainable Workflow to Implement Bedside Prescription Delivery at a Community Hospital

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Purpose: Hospital Consumer Assessments of Healthcare Providers and Systems (HCAHPS) survey results demonstrate that patients often do not understand the purpose of their discharge medications. Evidence has shown that the implementation of pharmacist-led bedside prescription delivery can reduce readmission rates, improve patient understanding of discharge instructions, and increase patient satisfaction. Current staffing shortages and cost containment prioritization make implementing new services challenging. The purpose of this project is to establish a sustainable workflow for bedside prescription delivery to support patients.
Methods: Key stakeholders were identified including surgeons, physician assistants, and nurses. Inpatient and outpatient pharmacy staff collaborated to create a process map for discharge prescription delivery. Pharmacy staff met regularly to assess the service and discuss opportunities for improvement. Key stakeholders were engaged throughout the implementation of the delivery service with in-person meetings and updates to generate buy-in. Eligible patients included adults (age 18 and older) who had undergone open heart surgery or admitted on the medical unit at high risk for readmission and discharged to home with new or refill prescription medications. Inpatient pharmacists received consultations from providers via the electronic health record to offer the program to eligible patients. The primary objective of this project was to identify the resources needed to establish bedside medication delivery as a permanent service to patients. Secondary objectives included assessment of 30- and 90-day readmission rates, prescriptions captured by the outpatient pharmacy, and HCAHPS scores for selected units. This project was submitted to the Institutional Review Board (IRB) for review and classified as Quality Improvement. No further oversight by IRB was required.
Preliminary results: Study is in progress.
Conclusion: Study is in progress.
Learning Objectives:
Review the components needed to establish a sustainable workflow.
Identify the benefits of a pharmacy-driven bedside prescription delivery process.
Self Assessment Questions:
Which of the following is a benefit of a pharmacy-driven prescription bedside delivery process?
A. Lower readmission rates
B. Improved patient satisfaction
C. Improved nursing management satisfaction
D. A and B
Which of the following is a barrier to implementing new services?
A. Cost containment
B. Staffing shortages
C. Lack of stakeholder buy-in
D. All of the above
Q1 Answer: D Q2 Answer: D

Assessment of Safety of Current Heparin Dosing Guideline-Based Practices in the Obese Patient Population
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INTRODUCTION
In February 2020, a revised protocol delineating dosing strategies for continuous IV unfractionated heparin (UFH) for the treatment of venous thromboembolism (VTE), atrial fibrillation (AF) with active clot, and deep vein thrombosis (DVT) at Froedtert & the Medical College of Wisconsin. Following its implementation, it has been observed that initial infusion rate recommendations routinely overestimate UFH needs in the obese patient (BMI â‰¥30kg/m2) thus potentially increasing their risk of bleeding. To date, there has been no institutional investigation into safety of current protocol-guided dosing practices in obese and non-obese individuals. The aim of this project is to evaluate safety of current dosing practices and confirm or refute observations of local practitioners.

METHODS
This was a single-center cohort study. Charts of all individuals who were treated with a continuous UFH infusion utilizing the â€œstandard intensityâ€ strategy (80 unit/kg bolus; 18 unit/kg/hr initial rate) were reviewed. The primary outcome was number of patients with a supratherapeutic anti-Xa level (> 0.70 units/mL) 6-hours post-initiation of the infusion. Secondary outcomes include number of patients with new-onset, clinically significant bleeding events while receiving continuous IV UFH, percentage of patients that required â‰¥2 infusion rate changes to attain therapeutic anti-Xa level, and number of patients with a subtherapeutic anti-Xa level 6 hours post initiation of continuous UFH infusion. These outcomes were assessed in obese patient groups, including subdivision of the obese groups by Centers for Disease Control and Prevention (CDC) weight classification. Primary and secondary outcomes were compared amongst the obese patient groups but not between obese and non-obese arms due to conflicts with feasibility of this assessment in one yearâ€™s time.

RESULTS
TBD (This section will be removed in submission version unless prelim data is evaluated)

CONCLUSIONS
TBD (This section will be removed in submission version unless prelim data is evaluated)

Learning Objectives:
Identify unique baseline characteristics that may impact a patientâ€™s unfractionated heparin (UFH) requirements when therapeutically
Outline potential continuous IV UFH infusion dosing strategies that may accommodate the unique UFH needs of an obese patient
Self Assessment Questions:
Which of the following are MOST LIKELY to have a meaningful impact on a patientâ€™s unfractionated heparin requirements in the treatment of thrombotic disease?
A. Motor Function
B. Cognitive Function
C. Body Mass
D. Visual Function
Which of the following continuous IV unfractionated heparin (UFH) infusion dosing strategies would be MOST LIKELY to adjust for the unique needs of an obese patient?
A. e)Bolus: NONE; Initial Infusion Rate: 22 units/kg/hr (Actual Body Weight)
B. Bolus: 80 units/kg (Max 8000 units); Initial Infusion Rate: 14 units/kg/hr (Adjusted Body Weight)
C. Bolus: 80 units/kg (No Dose Cap); Initial Infusion Rate: 18 units/kg/hr (Actual Body Weight)
D. d)Bolus: 80 units/kg (Max 8000 units); Initial Infusion Rate: 18 units/kg/hr (Adjusted Body Weight)
Q1 Answer: C Q2 Answer: B

Bad Blood: Transitioning from factor Xa inhibitors to unfractionated heparin infusion
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Oral factor Xa inhibitors (FXAi) have the potential to influence coagulation assays. Specifically, the ability of FXAis to increase heparin anti-factor Xa (anti-Xa) levels may result in inaccurately monitoring unfractionated heparin (UFH). Due to a lack of clear guidance, there is no standard practice for transitioning from a FXAi to an UFH infusion, in terms of monitoring. This project aims to describe the use of anti-Xa level UFH monitoring nomograms and to assess their safety profiles in relation to recent FXAi use.

This retrospective chart review includes adult patients admitted to a large academic medical center in the Midwest, from December 2021 to December 2022, who received an oral FXAi in the 48 hours before they were transitioned to an UFH infusion. Patients were excluded if they had a bleeding diagnosis on admission. UFH infusions targeted either the standard anti-Xa range (0.3-0.7 IU/mL) or an elevated anti-Xa range (0.7-1.0 IU/mL). Primary outcomes of interest include the occurrence of new thromboses or major bleeding events during admission and up to 30 days after UFH administration was stopped. Other areas of interest include frequency of elevated baseline heparin anti-Xa level, how often UFH infusions needed to be adjusted, and new non-major bleeding events for both nomograms.

No major bleeding events or thromboses were identified in the patients reviewed to date. One patient experienced a minor bleed the day after receiving heparin monitored with the standard anti-Xa range. Baseline heparin anti-Xa levels were elevated in more than half of the patients reviewed (6/10). The standard anti-Xa goal was used more frequently (10/12 patients). Nearly half of patients (4/9 patients) using the standard anti-Xa goal needed a decreased infusion rate by 2 units/kg/hr at the first anti-Xa level check.

Learning Objectives:

Explain the effects of FXAi on the heparin anti-Xa assay.

Discuss why the alternative nomogram with a higher anti-Xa goal of 0.7-1.0 IU/mL can be utilized for UFH monitoring with recent FXAi use.

Self Assessment Questions:

Are there validated reference ranges that correlate FXAi peaks/troughs with anticoagulant effects?

A. Yes
B. No
C. It depends
D. I am unsure

If a baseline heparin anti-Xa is elevated (between 0.3-0.7), does that mean the patient is appropriately anticoagulated?

A. Yes
B. No
C. It depends
D. I am unsure

Q1 Answer: B Q2 Answer: C

Evaluation of anticoagulation strategies for portal vein thrombosis in cirrhosis patients

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decreased production of liver-produced coagulation factors. Management of PVT may include observation, anticoagulation, or surgical procedures. Anticoagulation strategies vary from traditional agents like unfractionated heparin (UFH), low molecular weight heparin (LMWH), and warfarin, to newer direct-oral anticoagulants (DOACs). Robust data on the preferred, safest anticoagulation agents for PVT is lacking and current guidelines do not provide a definitive evidence-based strategy. The purpose of this study was to evaluate the safety of anticoagulation strategies for the treatment of PVT in cirrhosis patients.

Methods: This was a multi-center, retrospective chart review of patients admitted to UofL Health - UofL Hospital or Jewish Hospital with cirrhosis and portal vein thrombosis from January 1, 2017 â€“ January 1, 2022. Patients were included if they received â‰¥3 doses of anticoagulation with LMWH, warfarin, or any of the following DOACs: apixaban, dabigatran, edoxaban, or rivaroxaban. Patients on anticoagulation for indications other than PVT were excluded. The primary outcome was the rate of overall bleeding events which was assessed using definitions from the International Society on Thrombosis and Haemostasis (ISTH). Secondary outcomes included rate of major and clinically relevant minor bleeding events, PVT resolution, mortality rate, continuation of anticoagulation at discharge, anticipated duration of anticoagulation, and incidence of hospital readmission.

Results/Conclusion: To be presented at the conference.

Learning Objectives:

Review previous literature on anticoagulation strategies for the treatment of PVT in cirrhosis patients

Discuss previous literature on anticoagulation strategies for the treatment of PVT in cirrhosis patients

Self Assessment Questions:

Which of the following hemostatic changes in cirrhosis results in increased thrombosis risk?

A. Decreased Factor VII synthesis
B. Increased antithrombin synthesis
C. Decreased von Willebrand factor

D. Decreased Protein C synthesis

Which direct-acting oral anticoagulant may be utilized in patients with moderate hepatic impairment (Child-Pugh Class B)?

A. Apixaban

B. Rivaroxaban

C. Edoxaban

D. Fondaparinux

Q1 Answer: D Q2 Answer: A

Evaluation of Rabbit Antithymocyte Globulin (rATG) Dosing in Elderly Kidney Transplant Recipients â€“ A Single Center Experience

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Purpose: rATG is a medication used for the prophylaxis of acute rejection in solid organ transplantation. At Loyola University Medical Center (LUMC), it is used for high-risk kidney transplant recipients at a set weight-based dose regardless of age, with methylprednisolone.

In comparison to younger adults, the elderly population undergo age-specific changes, such as shifts in their cytokine profile, immunosenescence, a reduction in their healing abilities, hormonal changes, and they typically have a higher incidence of comorbidities. This may warrant a reduction in immunosuppression during induction, as too much may predispose them to infections, malignancy, and other adverse effects. The purpose of this study is to identify rATG-related toxicities and their incidences in the elderly compared to younger adults, in addition to rates of rejection.

Methods: This is a single-center, retrospective cohort study of patients who received a kidney transplant at LUMC from August 1, 2019 â€“ August 30, 2021 and followed for 1 year post-transplantation. Inclusion criteria include age â‰¥ 18 and induction immunosuppression with rATG for kidney transplant. Exclusion criteria includes the use of mammalian target of rapamycin inhibitors or belatacept for maintenance immunosuppression, re-transplantation, dual-organ transplantation, and transplant recipients of any other organ. Participants will be stratified into two groups: the study group being the elderly cohort (age â‰¥ 65) and the control group being the non-elderly cohort (age 18-64).

Results: Results and conclusions will be presented at the 2023 Great Lakes Pharmacy Residents Conference.

Learning Objectives:

Review the pharmacology of rATG.

Identify the possible adverse effects and/or toxicities associated with the use of rATG.

Self Assessment Questions:

What best describes the mechanism of action of rATG?

A. Binds to CD20, causing B-cell lysis

B. Binds to CD25, inhibiting IL-2

C. Widespread T-cell depletion via various mechanisms including apoptosis

D. Binds to FKBP, inhibiting calcineurin

Which of the following is the least common adverse effect/toxicity associated with rATG?

A. Infections

B. Thrombocytopenia

C. Leukopenia

D. Hematochezia

Q1 Answer: C Q2 Answer: D

Comparison of Oral Phenobarbital to Chlordiazepoxide Protocol for Alcohol Withdrawal Syndrome

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Purpose: Benzodiazepine usage has been the recent standard of care in alcohol withdrawal protocols. There are safety concerns with benzodiazepine use, including respiratory depression and delirium when given in large cumulative doses. Our institution recently implemented an oral phenobarbital protocol for the prevention of alcohol withdrawal syndrome. Phenobarbital requires less frequent monitoring and overall has less risk for serious adverse effects compared to benzodiazepine use when dosed appropriately. This research aims to compare the effectiveness and safety of oral phenobarbital to the chlordiazepoxide protocol.

Methods: The oral phenobarbital protocol was implemented at our institution in November 2021. To compare the effectiveness and safety of the oral phenobarbital and the chlordiazepoxide protocol, retrospective data was reviewed for patients who received phenobarbital or chlordiazepoxide for alcohol withdrawal from November 2021 to July 2022.
Due to the limited usage of the phenobarbital protocol compared to the chlordiazepoxide protocol, all phenobarbital patients are included in the results, along with fifty randomly selected chlordiazepoxide patients for comparison. Pediatric patients, IV phenobarbital use, pregnancy, and patients who noted either study medication as a home medication are excluded from review. The primary outcome is the number of patients requiring medication escalation. This is defined as patients who received either chlordiazepoxide or phenobarbital for alcohol withdrawal and required an alternate agent, such as lorazepam, dexmedetomidine, chlordiazepoxide, or phenobarbital. Secondary outcomes include intensive care unit (ICU) for those initially admitted to the floor, ICU length of stay, hospital length of stay, percentage of time patients were outside a sedation-agitation scale score of four, and if the medication was required to be held due to adverse effects.

Results and conclusion: results and conclusions are in progress and will be presented at the Great Lakes Pharmacy Resident Conference

Learning Objectives:
Define the potential benefits of phenobarbital use for alcohol withdrawal syndrome
Recognize when therapy escalation may be necessary for patients being treated for alcohol withdrawal syndrome
Self Assessment Questions:
1. Which of the following is a benefit of using phenobarbital in alcohol withdrawal syndrome?
A. Increased risk for delirium
B. Lack of therapeutic medication-level monitoring
C. Short half-life
D. Less frequent monitoring
2. In which situation would therapy escalation for alcohol withdrawal be needed in a patient?
A. A patient who is actively having a seizure
B. A patient who has a sedation agitation score of four
C. A patient who presents with bradycardia
D. A patient with new leukocytosis
Q1 Answer: D Q2 Answer: A

Post-Exam Review Strategies and Pharmacy Student Learning

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course performance is immediately after exams after scores are released. These "post-exam review sessions" can take many forms, including but not limited to one-on-one meetings, group discussions, and exam question review sessions that take place outside of regularly-scheduled lecture times. These various strategies are implemented by each individual course director, and can be time-consuming.

It has been identified in literature that some study strategies are superior to others. It is also well-documented that students at the university level retain habits that were sufficient for secondary or even undergraduate university levels, but are no longer effective for learning the quantity and complexity of content in professional pharmacy program courses. Through a survey distributed to first-through-third year pharmacy students, we hope to assess the the effectiveness of current post-exam feedback strategies by evaluating the change in student study habits and perceived course performance.
Learning Objectives:
Identify study strategies that have shown to be most effective for long-term retention
Describe post-exam feedback strategies that most effectively facilitate adaptation of research-supported learning strategies
Self Assessment Questions:
Which of the following learning strategies has been shown to be MOST effective?
A. Re-watching Lectures
B. Practice Testing
C. Highlighting and Underlining
D. Keyword Mnemonics
Which post-exam feedback strategy is typically the LEAST time-intensive?

A. Distributing Examsoft Strengths and Opportunities reports
B. Exam retakes
C. One-on-one meetings with faculty
D. Group post-exam review sessions
Q1 Answer: B Q2 Answer: A

Impact of Lactate Clearance Rate and Lactate Normalization on Hospital Length of Stay in Patients with Septic Shock

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and prolonged time to lactate normalization are associated with increased mortality and poor outcomes. Early recognition of septic shock and implementation of The Surviving Sepsis Campaign (SSC) Bundle elements have been associated with improved outcomes and decreased mortality. For adults with septic shock, the SSC guidelines suggest guiding resuscitation to decrease serum lactate in patients with elevated lactate level, over not using serum lactate. The purpose of this study is to measure the impact of the rate of lactate clearance and lactate normalization on hospital length of stay in patients with septic shock.

Methods: This is a single-center, retrospective cohort study at a 433-bed, tertiary care, community hospital in central Kentucky with a 35-bed emergency department. Patients who present to the emergency department that are 18 years or older, and are found to be fully compliant with SEP-1 bundle elements as defined by CMS will be analyzed. Vulnerable populations, patients that died or transferred to hospice within 24 hours of admission, and COVID-19 positive patients will be excluded. Patients will be stratified into two cohorts based upon rapid versus slow lactate clearance or lactate normalization within 6 hours from emergency department triage. Rapid is defined as a reduction in lactate of 30% or greater or lactate normalization (<2 mmol/L). Slow is defined as a reduction in lactate less than 30% or a lactate remaining 2 mmol/L or greater. The primary outcome of the study is hospital length of stay (LOS). Secondary outcomes include mortality, admission to the intensive care unit (ICU), ICU LOS, 30-day readmission rates, and cost.

Results and Conclusions: Results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:

Define sepsis and classify patients into severe sepsis or septic shock per CMS SEP-1 definitions
Discuss the 2021 Surviving Sepsis Campaign recommendations and supporting literature in regard to lactate-guided resuscitation

Self Assessment Questions:

Which of the following patients, who have a suspected infection, would be classified as having septic shock per CMS SEP-1 definitions?
A. 92 year old female with a temperature of 103.2â„‰, initial lactate 2.1 mmol/L, and RR 22
B. 46 year old female with an initial MAP of 60 mmHg, temperature 101.1â„‰, and a MAP of 64 mmHg after adequate 30 mL/kg fluid resuscitation
C. 68 year old female with an initial lactate of 4.8 mmol/L, HR 82 bpm, and RR 25
D. 59 year old male with a MAP of 60 mmHg, temperature 100.9â„‰, and MAP of 68 mmHg after adequate 30 mL/kg fluid resuscitation
According to the 2021 Surviving Sepsis Campaign guidelines, which is correct?
A. Recommend guiding resuscitation to decrease serum lactate in patients with elevated lactate level, over not using serum lactate
B. Suggest using capillary refill time to guide resuscitation, over using serum lactate
C. Recommend against guiding resuscitation to decrease serum lactate in patients with elevated lactate level
D. Suggest guiding resuscitation to decrease serum lactate in patients with elevated lactate level, over not using serum lactate
Q1 Answer: B Q2 Answer: D

After-hours in-person versus after-hours telestroke response: How do they compare in door-to-needle (DTN) time?

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A telestroke platform used to respond to acute ischemic stroke (AIS) patients can be utilized when an in-person response is not feasible. This study aims to explore after-hours neurologist telestroke response compared to the after-hours in-person neurologist response on the DTN time of IV fibrinolytic therapy with alteplase in the emergency department at a Primacy Stroke Center. This was a single-center, retrospective, interrupted time series study of adult patients (n = 96) who received alteplase for the treatment of AIS between January 1st, 2015, and August 28th, 2022, within the hours of 5:00 PM-7:00 AM. The primary endpoint was to assess the DTN time in after-hours neurologist telestroke response versus after-hours in-person neurologist response. Secondary endpoints included characterizing the impact of an emergency medicine clinical pharmacist (EMCP), the National Institute of Health Stroke Scale (NIHSS) score, the ordering provider type, and the patientâ€™s age on the DTN time across each cohort. A Mann-Whitney U Test was performed to determine if there was a difference in the primary endpoint. Of the patients analyzed, 78% received care in-person while 28% received care via telestroke. No significant difference was detected in DTN time between after-hours neurologist telestroke response (73 minutes) and after-hours in-person neurologist response (67 minutes), p = 0.809. An EMCP responded to 23% of the recorded stroke alerts. The presence of an EMCP significantly reduced the DTN time across both cohorts; 49 minutes with an EMCP versus 79 minutes without an EMCP (p = <0.001). An EMCP reduces DTN time while neither an in-person nor telestroke neurologist response significantly reduces DTN time when treating AIS patients. If replicated, an expanded study period and adequate sample sizes would be needed to detect a possible significant difference between groups. Limitations of this study include sample size and assumption of proper charting.

Learning Objectives:

Review current literature surrounding the use of telehealth platforms for the treatment of acute ischemic stroke patients.

Recognize the impact of clinical pharmacy specialists on the care of acute ischemic stroke patients in the emergency department.

Self Assessment Questions:

Which dose of intravenous alteplase would be most appropriate for a patient who weighs 70 kg?

A. mg as an IV bolus over 1 minute followed by 81 mg over 60 minutes

B. 14 mg IV bolus

C. 6.3 mg as an IV bolus over 1 minute followed by 56.7 mg over 60 minutes

D. 25 mg IV bolus

Which of the following are contraindications to receiving alteplase for treatment of acute ischemic stroke?

A. Blood glucose of 42 mg/dL

B. Daily use of ASA 81 mg

C. History of intracranial hemorrhage 2 months ago

D. A and C

Q1 Answer: C Q2 Answer: D

Implementation of Omnicell XT Automated Dispensing Cabinets at University Hospital

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Appropriate, accurate, and timely distribution of medication to patientâ€™s is crucial role provided by the pharmacist. Automated dispensing cabinets (ADCs) within decentral patient care units aid pharmacists in achieving that goal and improving efficiency and accuracy in dispensing. The University of Wisconsin (UW) Health System utilizes a hybrid model for medication distribution with automation utilized for unit-dose orders, decentralized dispensing, and individual patient orders. With recent updates to ADC at partnering facilities, University Hospital (UH) is also in need of an update that will also allow the organization to systematize and use one server through Omnicellâ€™s newest automation.

The purpose of this project is to implement Omnicell XT cabinets at UH, replacing current ADCs and allowing for a unifying platform amongst the organization. The objectives of the project will include: 1) Timeline determination, 2) Creation of training and education schedule for staff and users, and 3) Assessments of cabinet assignments and stocking standards.

Objective 1 methods: (1) Creation of pre-implementation schedule of staging and stocking ADCs, (2) Physical implementation of ADCs on decentralized units, (3) Creation of daily schedule for decommissioning, staging, and go-live of ADCs.
Objective 2 methods: (1) Review Omnicell trainings to determine necessary training objectives for pharmacy technicians, pharmacists, and nurses, (2) Creation of training tracker ensuring completion by critical staff and users.
Objective 3 methods: (1) Report analysis of each ADC assessing stocking volumes and utilization to determine adjustments, (2) Report analysis of medication stocking practices, common medications sent to unit and medication turnover rates.

Initial results to be presented at the Great Lakes Pharmacy Residency Conference

With initial ADC shipments occurring in next months, timelines, schedules, and education will provide framework of successful implementation. Post-implementation analysis may provide data on greater compliances with best practices regarding use of ADCs set forth by ASHP and ISMP.

Learning Objectives:

Recognize How continual updates in automation in pharmacy practice provide safe and timely medication delivery to patients

Discuss Automated dispensing cabinet related dispensing metrics and operations

Self Assessment Questions:

Which of the below are ISMP core safety processes related to automated dispensing cabinets (ADCs)?

A. Provide ideal environmental conditions for the safe use of ADCs
B. Provide profiled ADCs and monitor system overrides
C. Implement safe ADC stocking and return processes
D. All the above

How have automated dispensing cabinet impact the institutions safe medication related practices?

A. Allows for safe and secure access of a broad selection of medications
B. It provides medication delivery in a timely manner
C. It reduces medication dispensing/restocking errors to zero
D. A & B

Q1 Answer: D Q2 Answer: D

Catch Me If You Can: Implementation of a Multi-site Controlled Substance Waste Monitoring Program within a Large Academic Medical Center

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Statement of purpose:

Drug diversion continues to be an issue across UW Health patient care areas. Through detailed analysis, it was determined, monitoring and surveillance was one of our systemâ€™s greatest gaps regarding our drug diversion efforts. System-wide controlled substance waste monitoring at UW Health is variable, and in some cases, non-existent. Given noncompliance with ASHP guidelines, the Drug Diversion Prevention and Oversight Taskforce (DDPOT) was created and tasked to bolster our monitoring and surveillance efforts.

Statement of methods used:

A workgroup was formed in alignment with our taskforce to oversee the implementation of controlled substance waste testing devices. Direct observation of front-line staff was done to gain insight on our current controlled substance OR and non-OR waste testing procedures. Analyses were conducted to quantify the impact of current costs and interdisciplinary workload associated with workflows of current state. Contract negotiations with our external vendor were finalized, inclusive of a 12-month lease agreement with the option to outright purchase a desired quantity of devices immediately following. A thorough IS Security Risk Assessment, Legal Review, and Procurement Service Request was completed to confirm device purchase and installation. Implementation is slated for two sites, University Hospital and East Madison Hospital.

Summary of (preliminary) results to support conclusion:

Results to be presented at the Great Lakes Pharmacy Residency Conference

Conclusions:

Secondary objectives include improving waste sample turn-around time, increasing OR and Non-OR waste sampling bandwidth, quantifying the cost effectiveness of implementation, and increasing the number of annual investigations initiated. This project will provide a standardized health-system business case for implementation across external institutions.

Learning Objectives:

Describe the impact of controlled substance diversion on health-systems and patient care
Identify core elements of a Controlled Substance Diversion Prevention Program

Self Assessment Questions:

Which of the following is a potential consequence of not implementing a controlled substance waste monitoring process?

A. Increased compliance with ASHP guidelines
B. Tarnished institutional reputation
C. Mitigation of accrued health system fines
D. Added confidence in health system medication use process

Which of the following is an ASHP-endorsed core element of a Controlled Substance Diversion Prevention Program?

A. Board Certification Training
B. Interprofessional Collaboration
C. Executive-Level Support
D. Monitoring and Surveillance

Q1 Answer: B Q2 Answer: D

Dose-Adjusted EPOCH versus CHOP in High Risk Diffuse Large B-Cell Lymphoma

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Background: Double hit lymphoma (DHL), defined as high grade B-cell lymphoma harboring MYC rearrangement occurring with either B-cell CLL/lymphoma 2 (BCL2) and/or B-cell CLL/lymphoma 6 (BCL6) and triple hit lymphoma (THL), defined as harboring all three rearrangements, represents around 10% of diffuse large B-cell lymphomas (DLBCL). Multiple retrospective series suggest that patients with DHL and THL face poor prognoses when treated with rituximab plus cyclophosphamide, doxorubicin, vincristine, and prednisone (R-CHOP), with a median overall survival of 12 months or less. Due to this poor survival, chemotherapy intensification has been explored as a strategy to improve outcomes. The current national comprehensive cancer network (NCCN) guidelines recommend the use of dose-adjusted EPOCH (etoposide, prednisone, vincristine, cyclophosphamide, and doxorubicin) for treatment of DHL, however, there is a lack of supporting prospective data on its superiority. At Indiana University Health, patients diagnosed with DHL or THL are receiving both DA-EPOCH and CHOP.

Methods: This study is a retrospective chart review of patients with DHL or THL who completed 6 cycles of dose-adjusted EPOCH/R-EPOCH or CHOP/R-CHOP at Indiana University Health between January 1, 2015, and July 31, 2022. Patients were excluded if they were less than 18 years old, diagnosed with Burkitt lymphoma, or less than 3 months after completion of front-line therapy. Patients receiving DA-EPOCH were also excluded if they did not complete at least 5 cycles of chemotherapy. The primary endpoint is median progression free survival. Secondary endpoints include 2-year progression free survival, 3-year relapse free survival, median overall survival, 2-year overall survival and incidence of toxicities. Categorical data will be compared using the chi-square test, while continuous data will be compared using the paired t-test or Wilcoxon-signed rank test.

Results/Conclusions: Will be presented at the Great Lakes Pharmacy Resident Conference
Learning Objectives:
Define Diagnosis criteria for patients with double hit and triple hit lymphoma
Discuss Treatments available for patients with high B-cell lymphoma
Self Assessment Questions:
a. A 65 year old male presents with abdominal pain and was discovered to have a 3 cm mass in his abdomen. A biopsy was obtained, and the patient was diagnosed with diffuse large B-cell lymphoma. Cytogenetics were conducted and the patient was found to have MYC rearrangement along with translocation of BCL6. What would be the appropriate classification of this lymphoma?
A. Triple hit lymphoma
B. Double hit lymphoma
C. Single hit lymphoma
D. None of the above
a. Which regimen does the National Comprehensive Cancer Network recommend as first line therapy for patients with double hit lymphoma (DHL)?
A. CHOP
B. Hyper-CVAD
C. Dose-adjusted EPOCH
D. CODOX
Q1 Answer: B Q2 Answer: C

Pharmacist Impact on Diabetic Kidney Disease
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Purpose
Diabetic Kidney Disease (DKD) is a complication that affects about 9% of the worldâ€™s population and is commonly seen in patients with diabetes who have uncontrolled glucose and high blood pressure. Patients are diagnosed with DKD if their urinary albumin creatinine ratio (UACR) is ï‚³ 300 mg/g with or without an estimated glomerular filtration rate (eGFR) of 30-60 mL/min/1.73m2. Guideline recommendations include sodium glucose transport inhibitors and angiotensin converting enzyme inhibitors or angiotensin receptor blockers. However, less than half of the population are on these therapies. Pharmacists play a crucial role in a multidisciplinary, multi-specialty team-based model, but there is limited data to support the role of the pharmacists on optimization of guideline recommended therapies for DKD. The purpose of this study is to evaluate pharmacistsâ€™ impact on appropriate use of guideline recommended therapies for DKD.

Methods
This is a retrospective cohort study of patients with type 2 diabetes and DKD starting in January 2021. Patients were included if they met the following criteria: age 18 to 75 years old, UACR ï‚³ 300 mg/g, eGFR <60 mL/min, confirmed diagnosis of type 2 diabetes, and at least one visit for DKD at a primary care clinic in the health system. Patients will be grouped into one of two cohorts: seen by providers at a clinic with a Chronic Medication Optimization Pharmacist (CMOP) and seen by providers at a clinic without a CMOP. The primary outcome is proportion of patients on guideline recommended therapy for DKD. The secondary endpoint is incidence of safety events/side effects, including acute kidney injury, diabetic ketoacidosis, diuretic dose adjustment, or genital yeast infection that led to drug discontinuation. Any barriers that led to delay in initiation of guideline recommended therapy will be identified and analyzed.

Results/Conclusions: To be presented at the Great Lakes Pharmacy Residency Conference
Learning Objectives:
Define diabetic kidney disease
Review current guideline recommended therapies for diabetic kidney disease
Self Assessment Questions:
According to American Diabetes Association, which of the following are appropriate therapies for patients with DKD?
A. Sulfonylureas and insulin
B. GLP-1 inhibitors and DPP4 inhibitors
C. ACE-I or ARB and SGLT-2 inhibitors
D. ACE-I or ARB and DPP4 inhibitors
Which of the following patients would be classified as having diabetic kidney disease?
A. Diagnosis of diabetes and UACR greater than or equal to 300 mg/g
B. Estimated glomerular filtration rate of 30-60 mL/min/1.73m2
C. Diagnosis of diabetes and UACR less than 300 mg/g
D. Both A and B
Q1 Answer: C Q2 Answer: D

Characterizing Investigational Products on Home Medication Lists

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Purpose:
Electronic medication records (EHR) implementation has helped reduce the number of medication errors and adverse drug events resulting from those medication errors. Despite these advances, the incidence of unintended omission of home medications on admission is approximately 31.5% [Hale et al. 2013]. A pilot project conducted at an academic medical center suggests that outpatient oral and self-administered investigational products (IP) may be among these omissions. The pilot showed that only approximately 21% of IP are added to a patientâ€™s home medication list in the EHR within 48 hours of a study visit [Redic et al. 2017]. To our knowledge there are no studies further exploring the trends identified in this pilot. Therefore, this study aims to characterize time elapsed until IP is added to the participant medication list, the overall incidence of omission, and the accuracy of the IP information listed. Result of this project are anticipated to guide institutional best practices.
Methods:
This study will be a single center cross-sectional retrospective chart review. Clinical trial dispensation and participant enrollment records from January 1, 2021 to December 31, 2021 will be obtained from Michigan Medicineâ€™s Research Pharmacyâ€™s electronic drug accountability record system (Vestigo). Included dispenses will be limited to oral and self-administered products. Patients enrolled in trials prior to the interval but with dispensing activity during the interval will be excluded. The medical record will be searched for the study name and drug name. Patient notes from first date of dispensation and up to one year will be assessed for time elapsed until first mention of IP. Entries will be assessed for accuracy of IP entry including agent name, investigational designation, drug strength, route of administration, dosing frequency, and blinding, if appropriate.
Results/Conclusions:
To be presented at the Great Lakes Pharmacy Residency Conference.
Learning Objectives:
Describe appropriate documentation of clinical trial medications

Discuss unique considerations of clinical trial medications

Self Assessment Questions:

Which of the following appropriately documents a blinded clinical trial drug?

A. Aspirin 325mg PO daily
B. HUMXX Aspirin 325mg or Placebo. One capsule daily
C. TYPE-IN INVESTIGATIONAL MEDICATION
D. Not documented in the EHR

What are some unique considerations of study medications?

A. Blinding
B. Protocol deviations
C. Drug accountability
D. All of the above

Q1 Answer: B Q2 Answer: D

Increased Utilization of Pharmacy Services through Proactive Patient Engagement

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It is well documented that patient access and adherence to medications impact health outcomes. Health System Specialty Pharmacies (HSSP) are well positioned to demonstrate positive impact on these outcomes. However, patient engagement with HSSP continues to be a challenge in the specialty medication landscape of payer mandates in the United States. Froedtert Health offers robust medication access support, retail, home delivery, and specialty pharmacy services with demonstrated positive impact on patient outcomes, patient satisfaction and facilitated with a focus on safety & accuracy.The purpose of this study is to increase overall patient engagement with HSSP services at Froedtert Health. The primary objective is to develop and pilot patient outreach approaches to increase the prescription capture rate at Froedtert Health. The secondary objective is to determine the most effective method of patient engagement by comparing electronic vs. telephonic outreach along with pharmacist vs. technician completing the outreach.

Methods

The project includes two arms: The first arm will utilize existing electronic medical record functionality (Multi Step Order Transmittal; MSOT) to identify patients prescribed a specific non-specialty medication. MSOT is an Epic work queue functionality that supports pharmacy teams in reviewing prescription orders, confirming patient insurance coverage, addressing restrictions, and selecting a pharmacy for fulfillment. The second arm involves Proactive Patient Outreach (PPO) to engage patients prescribed a specialty medication from a Froedtert provider who is not currently utilizing HSSP services.

Results/Conclusions

Results and conclusions will be presented at the Great Lakes Pharmacy Residency Conference.

Learning Objectives:

Describe effective outreach methods for engaging patients in HSSP services
Describe the differences in HSSP patient engagement and prescription capture rate between different team members (pharmacist vs. technician)

Self Assessment Questions:

Based on our assessment, which outreach method was most successful in engaging patients in HSSP services?

A. Telephonic Outreach
B. Electronic Outreach
C. Telephonic & Electronic Outreach
D. Outreach through mail/post

Based on our assessment, which pharmacy team member was the most effective in engaging patients in HSSP services?

A. Pharmacist
B. Technician
C. No difference between a pharmacist & technician
D. Provider

Q1 Answer: B Q2 Answer: A

Safety and Efficacy of the Use of Direct Oral Anticoagulants (DOACs) in Patients with a History of Bariatric Surgery

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Background: Obese and morbidly obese patients are at an increased risk of non-valvular atrial fibrillation (NVAF) and venous thromboembolism (VTE). Anticoagulation management in post-bariatric surgery is challenging due to alterations in drug absorption and metabolism. DOAC use in this population is controversial, because DOACs were studied primarily in patients with fully intact gastrointestinal (GI) tracts. The four types of bariatric surgeries all have the potential to affect drug absorption, drug bioavailability, drug metabolism, caloric intake, and GI tract pH. Consequently, this leads to unpredictable changes in DOAC absorption and metabolism. Overall, there is a lack of data surrounding DOAC use post-bariatric surgery.

Statement of Purpose: This study aims to examine the DOAC safety and efficacy in post-bariatric surgery patients who are on therapeutic anticoagulation for atrial fibrillation or VTE compared to a matched non-bariatric surgery cohort.

Methods: This is a retrospective, matched cohort study comparing DOAC safety and efficacy in patients with bariatric surgery vs. patients without bariatric surgery at Michigan Medicine from January 1, 2014 to September 30, 2022. Inclusion criteria are patients > 18 years old with a VTE or NVAF diagnosis who received therapeutic DOAC anticoagulation post-bariatric surgery and matched patients receiving DOACs for the listed indications without bariatric surgery history. Exclusion criteria are any patients on warfarin anticoagulation for the same indications, any contraindications to DOACs, and patients not taking DOACs continuously. The primary efficacy outcomes of this study are a composite incidence of ischemic stroke, transient ischemic attack (TIA), VTE, and mortality. The primary safety outcomes of this study are a composite of major and non-major bleeding and mortality. A survival time-to-event analysis utilizing a Cox proportional hazards model plotted on a Kaplan-Meier curve will be performed.

Data is currently being collected; results and conclusions will be presented at the Great Lakes Pharmacy Resident Conference.

Learning Objectives:
Discuss how the pharmacokinetic parameters of each DOAC are affected by different bariatric surgeries
Identify key advantages and disadvantages in management and outcomes between warfarin and DOACs across the bariatric and non-bariatric surgery patient populations
Self Assessment Questions:
Which two proteins play a significant role in DOAC metabolism?
A. CYP2D6 and CYP3A4
B. CYP3A4 and P-gp
C. CYP1A2 and CYP2C19
D. CYP2C9 and CYP3A4
Which of the following statements is most accurate regarding anticoagulation management in the bariatric surgery population?
A. Warfarin is not preferred because obtaining frequent INRs is burdensome for patients
B. DOAC levels are frequently obtained and monitored inpatient and outpatient because they are reliable surrogates for efficacy and safety outcomes
C. Warfarin is preferred because INR can be monitored for therapeutic anticoagulation whereas DOAC levels are not linked reliably to efficacy and safety outcomes
D. There are numerous prospective randomized controlled trials that show DOACs are superior to warfarin regarding efficacy and safety outcomes
Q1 Answer: B Q2 Answer: C

Medication Reconciliation for Psychiatric Patients in the Emergency Department Awaiting Transfer

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Background: Medication reconciliation is a practice utilized by healthcare systems to prevent medication errors and has been shown to improve patient safety by creating an accurate medication list and reducing unintentional medication discrepancies. A population that remains uniquely vulnerable to medication errors is psychiatric and mental health patients due to an increased need for inpatient care, decreased availability of treatment facilities and complex medication regimens including antipsychotics, antidepressants, central nervous stimulants, mood stabilizers, and anxiolytic medications. These patients often seek treatment through Emergency Departments (ED), and require transfer to specialty inpatient psychiatric care facilities. Despite the established benefit of medication reconciliation on patient outcomes, many institutions lack firm policies to ensure accurate and timely review of patient medication histories. Although psychiatric patients have an increased risk of medication errors, there is little data addressing the medication reconciliation needs of these patients. Previous studies have largely examined the utility of medication reconciliation in the ED, or the heavy impact of medication errors in this population.
Statement of Purpose: To evaluate the impact of a pharmacist-led medication reconciliation program on psychiatric patients awaiting transfer to outside facilities while in the ED.
Methods: This is a single-center, prospective, quality improvement study. Inclusion criteria includes patients >18 years old, admitted to Loyola University Medical Center ED for Psychiatric Evaluation. Patients must be awaiting transfer to either an outside facility or home. Exclusion criteria includes patient age under 18 years old, patients requiring inpatient admission, and patients who present violent or would otherwise pose a risk to investigators. Data collected includes demographics, allergies, chief complaint, number of home medications, length of ED stay, duration of time from ED admission to medication reconciliation completion, category and classification of medication discrepancies, and total number of discrepancies and interventions made.
Data collection and analysis are ongoing.

Learning Objectives:
Describe medication reconciliation process
Identify risk factors medication-related errors in psychiatric patients awaiting transfer in the ED
Self Assessment Questions:
Which of the following is a barrier to effective medication reconciliation for ED patients?
A. Simple home medication regimens
B. Established institutional medication reconciliation policies
C. Increased transitions of care events
D. Cross-training of multiple healthcare teams (Nurses, pharmacists, physicians, etc.)
An ED patient takes Atorvastatin and Eliquis at home. While admitted, the patient receives rosuvastatin due to the hospitalâ€™s formulary. Eliquis is not given, as it was recently started and not seen on the list of Home Medications. This would be classified as:
A. Wrong drug
B. Medication omission
C. Duplicate therapy
D. Completed therapy
Q1 Answer: C Q2 Answer: B

The Effects of Music Therapy on Patients Undergoing Procedural Sedation with Ketamine in the Emergency Department
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procedures has been associated with an undesirable effect known as ketamine-associated emergence phenomenon. Currently, there is limited data on the effect of utilizing music therapy during ketamine sedation in the emergency department (ED). The aim of this study was to determine the effect of adjunctive music therapy on ketamine-associated emergence phenomenon and patient satisfaction during procedural sedations performed in the ED.

Methods: This was a single-center, prospective, observational cohort study conducted in the ED at University of Louisville Hospital. Adult patients undergoing procedural sedation in the ED with ketamine as the primary agent qualified for inclusion. Excluded patients were those who had hearing impairment, history of dementia, active psychosis, suspicion of acute intoxication, were non-English speaking, a prisoner, or were pregnant. Music use rotated monthly between music and non-music therapy. During music months, patients were allowed to select from a variety of genre-based playlists compiled in collaboration with licensed musical therapists. Ketamine dosing followed standard of care and was at the discretion of the supervising provider. The primary outcome of interest was the difference in patients reporting bothersome (3) or very bothersome (4) experiences on the Side Effects Rating Scale for Dissociative Anesthetics (SERSDA), or those with a score greater than or equal to 2 on the Sedation Assessment Tool (SAT). Secondary outcomes included the difference in total ketamine requirements, need for additional ketamine doses, and patients requiring other sedative agents. The study sought to enroll 43 patients in each group providing 80% power to detect a 25% difference in the rates of the primary outcome.

Learning Objectives:
Identify possible complications related to the common pharmacologic agents utilized during procedural sedation.

Describe the potential benefits of utilizing music therapy during ketamine-based procedural sedation in the emergency department.

Self Assessment Questions:

Ketamine-associated emergence phenomenon may complicate procedural sedation via which mechanism(s)?

A. Prolonged recovery time
B. Reduced patient satisfaction
C. Decreased time spent in emergency deparment
D. A & B

Proposed benefits of music therapy during ketamine-based procedural sedation include:

A. Increased emergency department length of stay
B. Improved patient experience
C. Decreased rates of emergence phenomenon
D. B & C

Q1 Answer: D Q2 Answer: D

â€˜Identifying the Greater Aggregatorâ€™: Assessing and Implementing Specialty Pharmacy Data Aggregation within an Academic Medical Center Specialty Pharmacy

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outcomes of the preferred process within an academic medical centerâ€™s specialty pharmacy.

Methods: Specialty pharmacy data aggregation processes within UW Health and the specialty pharmacy marketplace will be defined by documenting UW Health and vendor requirements with regards to workflows involved to establish and maintain data feeds, data safety and ownership, cost and contract terms, specialty pharmacy medication exclusions, and specific data specification requirements. Utilizing the information collected, the superior data aggregation process will be assessed via gap analysis of an internal analyst, the top three vendors, and ideal state. Standardized work for establishing data feeds to the vendor or internal analyst will be developed with implementation of a data aggregation feed. Following implementation, specialty pharmacy data aggregation outcomes will be evaluated including change in access to drug compared to baseline, measurement of revenue compared to baseline, and improvement in analyst work hours dedicated to data aggregation workflows compared to baseline.

Preliminary results: Development of an internal data submission process at UW Health is preferred to data aggregator services available in the marketplace. Similar methods should be pursued by other health systems to confirm the optimal approach.

Conclusions To be presented at GLPRC

Learning Objectives:

Define data aggregation
Recognize the benefits of data submission to manufacturers

Self Assessment Questions:

1. What is the definition of data aggregation?

A. The process of compiling and summarizing data
B. The process of submitting data to manufacturers
C. The process of breaking a data set into smaller units of data
D. The process of entering data

Which of the following are benefits of submitting data?

A. Increased access to drugs
B. Improved patient population data for manufacturers
C. Better visibility of provider dispensing trends to manufacturers
D. All of the above

Q1 Answer: A Q2 Answer: D

Assessing the Impact of Fluid Resuscitation Timing in Hypotensive Septic Patients

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Sepsis, defined as life-threatening organ dysfunction due to a dysregulated host response to infection, is associated with increased patient mortality, morbidity, length of inpatient stay, and overall healthcare costs. Guidelines suggest prompt intravenous crystalloid fluid resuscitation of 30mL/kg for sepsis-induced hypoperfusion within three hours of inpatient presentation. Prior literature has demonstrated mortality reduction with appropriate fluid resuscitation within three hours; however, no relationship between length of stay and more rapid fluid resuscitation (< 1 hour from presentation) has been established. Therefore, the purpose of this study is to assess the impact of fluid resuscitation timing in hypotensive septic patients.
This is a retrospective, single-center, cohort study at a 433-bed community hospital in central Kentucky. Patients will be collected in two cohorts: those receiving initial fluid resuscitation in < 3 hours versus < 1 hour. Patients admitted through the emergency department between October 2016 and August 2022 with a documented diagnosis of sepsis and hypotension (MAP < 65 or SBP < 90mmHg) will be included. Only patients meeting all interventional 3 and 6 hour bundle elements will be analyzed. Patients will be excluded if they are less than 18 years of age, immunocompromised, pregnant, imprisoned, transferred from another facility, or died within the first 24 hours of admission. The primary outcome will be total hospital length of stay (LOS). Secondary outcomes include inpatient all-cause mortality, ICU LOS, need for vasopressor therapy, MAP normalization within 6 hours, and 30-day hospital readmission. Data will be tested for normality of distribution and analyzed with appropriate statistical methods utilizing SPSS version 28. An alpha of 0.05 and 95% confidence intervals will be used. Final results to be presented at the conference.

Learning Objectives:
Recall the specific guideline suggestions for sepsis bundle elements
Describe the impact of fluid resuscitation timing in hypoperfused septic patients
Self Assessment Questions:
1. When is fluid resuscitation of 30mL/kg indicated?
A. MAP < 65mmHg
B. SBP < 90mmHg
C. Lactate > 4 mmol/L
D. All of the above
Fluid resuscitation in the setting of sepsis or septic shock should be administered within ___ hours of inpatient presentation.
A. three
B. six
C. two
D. one
Q1 Answer: D Q2 Answer: A

Clinical implications of a formulary conversion from budesonide/formoterol to fluticasone/salmeterol in a VA Medical Center
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The study will examine the clinical outcomes resulting from the formulary change of budesonide/formoterol inhaler to fluticasone/salmeterol inhaler in patients with chronic obstructive pulmonary disease (COPD). VA Medical Centers transitioned patients prescribed budesonide/formoterol inhaler to fluticasone/salmeterol inhaler. The goal of this project is to assess the patient outcomes resulting from the conversion and determine if the conversion was beneficial for patients.
Rationale:
In West Virginia, the prevalence of COPD in 2018 was 13.9%, the highest in the United States. COPD is a respiratory disorder associated with systemic inflammation that is chronic and slowly progressive. It includes emphysema, chronic bronchitis, and small airway disease.. The Global Initiative for Chronic Lung Disease Guidelines recommend a combination inhaler of a long-acting beta-2 agonist (LABA) and inhaled corticosteroid (ICS) for patients with a history of exacerbations. Some of the common ICS-LABA inhalers include the combination of budesonide/formoterol or fluticasone/salmeterol. When the two were compared, patients treated with the budesonide/formoterol inhaler were significantly less likely to experience a COPD-related exacerbation than those treated with fluticasone/salmeterol inhaler. This study will gather information to determine if switching from the budesonide/formoterol inhaler to the fluticasone/salmeterol inhaler affects the outcomes of COPD patients in a veteran population.
Procedures:
A retrospective chart review will be conducted on patients at the VAMC with a prescription for a budesonide/formoterol inhaler and a prescription for a fluticasone/salmeterol inhaler between February 1, 2021, and May 30, 2022. The primary outcome is to assess the clinical outcomes, such as the number of COPD exacerbations and hospitalizations, of the patients affected by the formulary conversion within our VA medical center. The secondary outcomes include the incidence of adverse effects, treatment failure, compliance, antimicrobial utilization, and the appropriateness of the inhaler switch based on labs and diagnostic workup.

Learning Objectives:
Recognize the patient population with COPD who warrant ICS-LABA therapy per guidelines.
Discuss the beneficial outcomes for the veteran population with the transition from budesonide/formoterol inhaler to fluticasone/salmeterol inhaler.
Self Assessment Questions:

Which of the following is a major counseling point when counseling someone on an ICS-LABA inhaler?

A. It is a onetime use inhaler

B. Rinse your mouth and spit after use to avoid oral thrush

C. Store the inhaler in the refrigerator

D. Do not exhale before you use your inhaler

Which of the following should be met before starting a patient with COPD on an ICS-LABA inhaler?

A. Patient has frequent exacerbations despite being adherent to a LABA + LAMA inhaler regimen.

B. Patient should trial ICS monotherapy before starting them on combination ICS-LABA therapy.

C. Patient should have a blood eosinophil count greater or equal to 300.

D. Both Answers A and C are correct.

Q1 Answer: B Q2 Answer: D